

Railroad Age Gazette

DAILY EDITION

VOL. XLV

NEW YORK—JUNE 20, 1908—ATLANTIC CITY

No. 3B

PUBLISHED DAILY BY
THE RAILROAD GAZETTE (INC.)

AT

83 FULTON STREET, NEW YORK

On the occasion of the Annual Conventions of the Master Car Builders' and
American Railway Master Mechanics' Associations.

CHICAGO: 160 Harrison Street PITTSBURG: Farmers' Bank Building
LONDON: Queen Anne's Chambers, Westminster

W. H. BOARDMAN, *President and Editor*

E. A. SIMMONS,
Vice-President

RAY MORRIS,
Secretary and Managing Editor

R. S. CHISOLM, *Treasurer*

The address of the company is the address of the officers

Subscription including regular weekly issues and special daily editions
published from time to time in New York, or in places other than New York,
payable in advance and postage free:

United States and Mexico	- - - -	\$5.00 a year
Canada	- - - -	\$6.00 a year
Foreign Edition, London	- - - -	£1 12s (\$8.00) a year
Single Copies	- - - -	15 cts. each

Application made at the Post Office at New York for entry as mail matter
of the second class

Those hearing the discussion on "Cast Iron Wheels" at Thursday's session of the M. C. B. association must have been impressed with the fact that this is a live subject. There was a virtual acknowledgment that the present practices in wheel manufacturing are not what they should be and that something more than physical tests and guarantees is wanted. For example, it was urged that the specifications should include the chemical composition and limit the sulphur content to from 0.12 to 0.13 per cent at most. This was based upon the ground that in the cases of many failed wheels that have been examined, it was found that those in which the flanges had broken averaged 0.19 to 0.20 per cent sulphur, whereas those that had been removed for legitimate wear had not more than 0.09 or 0.10 per cent. Pointing to that element as the cause of broken wheels, accidents and the consequent losses, it was shown that the repeated melting of old wheels with coke high in sulphur was responsible for much of the trouble, and, therefore, the proportion of scrap used should be strictly limited. In short, it appears that the cast wheel needs improving and that a part of this improvement must be in the form of an elimination of practices that make for a dangerous chemical composition. Whether the necessary betterment can be obtained by this means with a change in pattern forms remains to be seen, but it is, at least, worth a trial.

The social and amusement features incident to the Master Car Builders' and the Master Mechanics' conventions have grown in number and interest year by year. There are very few who would go back to the days when the conventions were almost exclusively business sessions. There may have been at times a tendency toward too intense rivalry for social leadership. There may have been at times a tendency to carry gorgeousness of dress and lavishness of expenditure of extremes. But fundamentally, and in most respects, the social functions have been what they ought to be, varied, simple and democratic enough for everybody who comes to enjoy them thoroughly. Visitors have dressed as they liked, gone where they pleased, and been made welcome in whatever group they have happened to meet. If this has not always seemed to be the case to those attending

the conventions for the first time, it is due to the diffidence of the newcomers, not to the attitude of the crowd. The disposition of the reception and entertainment committees, and of every one else in a position of social leadership at the conventions, is to do everything possible to make all in attendance have a good time, and no efforts are spared to accomplish this purpose. If diffident new comers will but put themselves into the hands of the proper committees they will be surprised to find how soon they will become socially part and parcel of one of the jolliest, most sociable and most hospitable crowds that ever assembled in this country. It should be the constant aim and effort of those interested in and responsible for the success of the conventions and the incidental exhibition of railway supplies to keep the functions, as they have been in the past, varied, simple and democratic. To forget these ideals would be in the long run to do a great deal of harm to all who are concerned in the practical as well as in the social success of the conventions.

The Individual Car Owners' Association is urging upon the Master Car Builders' Association that it so amend the rules of interchange affecting privately owned cars that private car owners will not suffer from application of the present rules defining rough usage, which the private car owners claim are too narrow. There are some 500 individual firms and corporations in the United States which own in the aggregate over 300,000 freight cars, representing an invested capital of \$250,000,000. It is the contention of individual car owners that while the present rules regarding rough usage may result in substantial justice as between railroads where it is expected that improper usage, though not technically "rough usage" under the rules of a railroad car by a foreign road, will be offset by similar usage on the home road of a foreign car. The private car owners contend that their situation is different, since they are not in a position to inflict improper injury upon railroad cars, and that a revision of the rules should be made.

PROTECTIVE COATINGS FOR STEEL FREIGHT CARS.

The subject of protective coatings for steel has occupied the attention of several technical societies and most paint manufacturers for a number of years, and the literature of the subject is extensive. Several voluminous papers relating to corrosion and protective coatings have been presented before the American Society of Mechanical Engineers and they were discussed at length by the best experts in that department of technology. More recently the American Society for Testing Materials has had a standing committee working on the problem and it has arranged for extensive tests, particularly in connection with the painting of steel railroad bridges and viaducts. Some of the paint manufacturers have published complete treatises on protective coatings for metal, advocating, of course, their particular pigment or vehicle.

In all these we do not remember to have noticed any suggestion which corresponds with the ideas of the Master Car Builders' committee on "Protective Coatings for Steel Cars." As far as we can gather from the brief report, the best method is to paint the exterior of the cars with a black paint and then grease it with a coating of good fish oil, locomotive cylinder oil, a mixture of raw linseed oil and pure glycerin, or commercial tallow well rubbed in. The only tests which are being made under the direction of the committee are

with one car each, coated with these different oils or greases. This indicates a new departure in the industrial protection of steel. It is a familiar practice of the housewife to grease the sad iron or oil polished steel to prevent rust, and some machine tool builders give the polished surfaces a coating of vaseline or paraffine before shipment, but all these are intended for temporary protection and are not used as permanent coatings. On the rolled steel sheets of steel cars a coating of magnetic oxide is already formed and the prevention of rust on such a surface is different from that of a polished surface.

The new theory in regard to the preservation of timber is that it is only necessary to thoroughly coat the walls of the wood cells with oil, that is, to so thoroughly grease them as to make them waterproof, and the antiseptic quality of the oil is not important. It would be strange indeed if it is found that the prevention of corrosion in steel can be accomplished in a similar manner, but it seems too easy to be true. Grease or oil of any kind described by the committee does not dry, and in freight car service it would soon become mixed with dust from the track and the coal breakers or the ore docks, and in that condition would be easily washed off. Any protective coating which does not dry is fugitive and not permanent, and we should not expect any substantial results from such treatment.

We hope that further experiments in protecting steel cars will include permanent coatings, and that the investigation will be made in collaboration with those railroad testing engineers and chemists who are identified with the more extensive and hopeful experimental work which is being conducted by the American Society for Testing Materials. This society holds its annual meeting at Atlantic City, June 23 to 27, and its programme includes a report from the committee on "Protective Coatings for Metal," this subject being scheduled for the meeting on Friday, June 26, at 10 a.m. The Master Car Builders' Association should delegate one or more of the members of its committee on the "Protection of Steel Cars" to attend this meeting and hear the discussion, and it would then have a basis for a new series of tests from which we might expect more valuable results.

SIDE-BEARINGS AND CENTER-PLATES.

The report of the committee on "Side-Bearings and Center-Plates" indicates that car builders are alive to the importance of reducing the friction of these parts and of the direct effect of that friction on wheel flange wear and train resistance. The long discussion on the report, while interesting and profitable, was much of it a repetition of familiar tales which have often been told at previous conventions, but the continued agitation of the necessity for anti-friction plates and side-bearings, especially for high capacity cars, is time well spent. First, came the disagreement of the committee as to a standard dimension for the spread of center-plates. As the majority report well said "the association evidently desired a recommendation for this standard," it was proper that it name a figure which the majority preferred. Sixty inches is evidently the spread which has been found satisfactory to many railroads, and as it makes little difference so far as truck motion is concerned whether this is slightly increased or diminished, that figure could at least be safely adopted as recommended practice.

Next came a disagreement as to the distance between side-bearings and its effect on derailments and flange friction. While some speakers in the discussion thought that a difference of $\frac{1}{8}$ inch had an important effect and that there was some special virtue in $\frac{3}{8}$ -inch clearance on a side, yet it was made clear that under ideal conditions there would be no clearance and no pressure at side-bearings. The ordinary clearance allowed in freight service is to take up the deflection of the bolsters under the full load and avoid excessive pressure on both side-bearings. In passenger cars where

the live load is small compared with the weight of car no clearance of side-bearings is provided, but on freight cars the conditions are exactly the opposite, and for this reason, for high capacity cars at least, it is time that the crude attempt to adjust the pressure on side-bearings by a definite standard clearance for all kinds and conditions of cars be abandoned and resort be had to the perfection of the anti-friction side-bearing with no clearance.

The introduction of ball or roller bearing center-plates should be accompanied by anti-friction side-bearings with no clearance, although this requirement has not always been appreciated or followed. In the use of such fixtures more than usual care should be taken to adjust the bearings so that the center-plate carries all the load on level straight track and that it does not become excessive on side-bearings in rounding curves. In order to get anti-friction bearings so adjusted in the rough work of freight car building there must be a better understanding of conditions of pressure based upon exact measurements. Though the committee recommended that tests be conducted at one of the universities, it is plain that while the relative friction of different center-plate and side-bearings under a center load could be obtained with accuracy in laboratory tests, yet the transfer of load from center-plate to side-bearing by centrifugal force in rounding curves could only be obtained and measured on cars in regular service. This whole question involves experimental work of the most interesting character and should produce results which will materially affect car and truck construction and lead to the introduction of improvements which will largely reduce flange wear, flange friction and train resistance.

THE VENTILATING AND HEATING OF PASSENGER CARS.

Continued agitation of the subject of the better ventilation of passenger cars is at length beginning to show some favorable results, and it is safe to say that more attention is now being given to it than ever before. Steam heating has been generally introduced and the cars on most of the large systems are now heated by steam from the locomotive. The principal complaint now is that the work is overdone and as a rule cars are too hot, especially in moderate weather when proper attention is not given to the regulation of temperature. With an excess of heat supply it should be possible to maintain a comfortable temperature in passenger cars more easily than when the heat supply is irregular or insufficient. The complaint of overheating comes most frequently from the Pullman passengers who have paid an extra fare for increased comfort and who are often in the matter of temperature more uncomfortable than the occupants of the ordinary coaches. It is encouraging to know that the Pullman Company during the past year has been actively engaged in fitting its cars with the Garland ventilator, which if properly handled is quite efficient in changing the air in the cars at a rate which is more than sufficient to maintain a low percentage of carbonic acid and at the same time prevent the air from becoming overheated.

The Pullman Company has equipped 2,500 of its sleeping cars, or about one-half of the total cars owned, with this ventilator, and is continuing the work of fitting them to all cars. These ventilators have an excess capacity which is a good quality, but they should be properly regulated in cold weather so as not to produce too great a drain on the heating system which results in the extravagant use of steam and locomotive fuel. It is claimed that at the higher rates of speeds this ventilator will exhaust from the car 15,000 cubic feet of air per hour and the ten ventilators with which the Pullman cars are equipped have a total capacity of 150,000 cubic feet per car hour, and this is sufficient to change all the air in the car in less than two minutes, which is more frequently than necessary in cold weather.

The ventilating system adopted by the Pennsylvania,

which is a combination of heating and ventilating, is regarded as a very satisfactory system for coaches. The aim has been to supply 1,000 cubic feet of fresh air per passenger per hour, or 60,000 cubic feet per hour for a full car containing 60 passengers. It is found that this is as large a volume of air as can be heated by the induction system and indirect radiation without too great an expense for equipment and fuel.

None of the reports on either of these systems gives any figures showing the amount of coal used on the locomotive for steam heating of cars but it is possible to make a rough calculation which will give approximate figures for our purpose. Assume the exterior air to be 20 degrees F. and interior air to be maintained at 70 degrees, the rise in temperature is 50 degrees. The specific heat of air at constant pressure is 0.2375 and the weight of one cubic foot at 70 degrees F. is 0.07495 pound, and the product of these is 0.0178. To heat 60,000 cubic feet per hour 50 degrees requires therefore $60,000 \times 50 \times 0.0178 = 53,400$ British thermal units. The efficiency of the locomotive boiler when working at the express speeds may be taken at 60 per cent, and a good grade of coal contains 14,000 heat units per pound so that the boiler should deliver 8,400 heat units, not counting losses from leakage and radiation in transmission from the boiler to the car. We have then $53,400 \div 8,400 = 63.6$ pounds of coal per car hour or 636 pounds per hour for a train of 10 cars. Taking 4 pounds of coal per horsepower hour, we have 159 horsepower as the boiler capacity required for heating the train. If now the Pullman ventilators are allowed to operate at maximum capacity and exhaust 150,000 cubic feet of air per car hour and require that amount to be heated 50 degrees, it would require $2\frac{1}{2}$ times 167 horsepower or 397.5 horsepower of the boiler's capacity to heat the train under the assumed conditions.

This calculation is made to show the results of using a system of steam heat with excess capacity in connection with a ventilating system with excess capacity and neither of them working under intelligent regulation. The Pullman cars seldom contain over 30 passengers, or one-half the capacity of the coaches, and in severe winter weather a supply of 30,000 cubic feet per hour would provide ample ventilation and this would be only one-fifth the total capacity of the ventilators. If we add to 400 horsepower for heating under maximum conditions, 60 horsepower for electric lighting by the turbo-generator, which consumes about 100 pounds of steam per kilowatt-hour, we have 460 boiler horsepower to be provided for heating and lighting a modern first-class passenger train in addition to that required to haul the train.

It is interesting to note the manner in which this has been provided and the change in the type of locomotive which has taken place to meet the extra demand for steam. A few years ago the Atlantic type with 100,000 pounds on drivers and 3,000 square feet of heating surface was regarded as a large and powerful passenger engine, sufficient for high-speed trains of ordinary size. At present many of the trunk lines are using the Pacific type, having 3,500 to 4,000 square feet of heating surface. Taking two square feet of heating surface per horsepower the Pacific engines provide 250 to 500 boiler horsepower more than the Atlantic type, and as we have shown it is possible in cold weather to absorb the bulk of it in unregulated heating, ventilating and lighting of the train.

In moderate weather and in summer the Garland ventilator can be used to maximum capacity without extravagance in the use of fuel and with increased comfort for the passenger. The experience with it in the south and in Mexico is that it keeps the cars much more free from dust, smoke and sparks and also cooler than when ventilated by the open transoms in the ordinary way. Each of the ventilating systems we have referred to depends upon the motion of the train for effective operation, and they should therefore be supplemented by exhaust fans or blowers to be used when the

train is at rest. Most of the parlor, buffet and dining cars are now equipped with electric fans which simply agitate the foul air but do not insure a supply of fresh air. As the electric current is usually available it would be easily possible to connect the fans with exhaust ducts and operate them when the car is not in motion. They would thus assist in removing a large portion of the foul air and a supply of pure air would find its way into the car.

THE "OLD-TIMERS' REGISTER."

The "Old-Timers' Register" opened on Thursday at the booth of The Railway Review has been productive of large as well as surprising results—surprising in that it appears that some of the fellows who have been appearing to their acquaintances as among the younger set have been attending the conventions for anywhere from 20 to 40 years. The whole story is told on the register. The first name appearing is that of John N. Reynolds, of the Railroad Age Gazette, who confesses to 33 consecutive years; F. W. Edmunds, Dressel Railway Lamp Works begun to attend 28 years ago; Nat P. Lane, Bird-Archer Company, claims 39 years; Willard A. Smith, Railway Review, 33 years; J. Alexander Brown, Pocket List, 20 years; James E. Minor, Nathan Manufacturing Company, 25 years; W. J. Robertson, W. H. Miner Company, 23 years; William Voss, American Car & Foundry Company, 20 years; Daniel M. Brady, Brady Brass Company, 34 years; H. C. Buhoup, McConway & Torley Company, 27 years; John F. Divine, 38 years; W. E. Bryant, Michigan Lubricator Company, 24 years; James B. Brady, Standard Car Company, 40 years; W. J. Courtney, 23 years; L. F. Purtill, 20 consecutive years; Fred. G. Ely, 21 years; W. A. Blanchard, 23 years; W. H. Lewis, 33 years; W. H. Thomas, 26 years; C. H. Cory, 33 years; H. Monkhouse, 25 years; Garrett Burget, 21 years; C. H. Boaz, 30 years; J. J. McCarthy, 30 years; A. H. Watt, 26 years; James Timms, 24 years; Rufus Hill, 36 years; J. W. Marden, 31 years; Clarence E. Rood, 22 years; George H. Bryant, 23 years; F. W. Snow, 22 years; Thomas M. Gallagher, 25 years; Frederick A. Guild, 26 years; J. H. Setchel, 40 years; O. R. Ford, 35 years; W. C. Arp, 22 years; E. W. Grieves, 23 years. This is a good beginning of what promises to be a most interesting and valuable record. Many points are contained in the register which have not been reproduced here. It is hoped that any persons who attended a convention so long as 20 years ago will signify the fact upon the register kept at the office of the Railway Review.

The second day's registration added the following names to the above list: Geo. S. Bigelow, 25 years; Eugene Chamberlain, 24 years; H. S. Hayward, 32 years; L. R. Pomeroy, 22 years; W. T. Smith, 39 years; Sanford Keeler, 39 years; F. L. Wells, 24 years; D. C. Noble, 20 years; Peter H. Peck, 22 years; A. W. Gibbs, 22 years; R. B. Williams, 35 years; W. McWood, 34 years; C. A. Schroyer, 22 years; John Chamberlain, 26 years; R. C. Fraser, 21 years; W. S. Morris, 20 years; William Forsyth, 27 years; H. M. Perry, 41 years; Chas. T. Schoen, 32 years; Jos. Leidenger, 25 years; Geo. L. Fowler, 22 years; Chas. F. Pierce, 27 years; Geo. E. Pratt, 27 years; Fred. A. Case, 30 years; Geo. N. Riley, 20 years; Chas. R. Kearns, 30 years; F. W. Brazier, 24 years; Geo. E. Sevey, 21 years; E. L. Adreon, 20 years; F. P. Huntley, 20 years; W. B. Waggoner, 23 years; Jas. E. Keegan, 22 years; Thos. Aldcorn, 21 years; J. J. Hennessey, 20 years; Harry D. Vought, 22 years; Jos. Waycock, 23 years; F. O. Ketcham, 21 years.

Visitors to the convention will be interested in the exhibit of the National Lock Washer Company where are shown car window sash locks and fittings, curtains and fixtures, and nut locks for all sorts of construction requiring bolts and nuts. The company has recently installed additional facilities for the production of its goods, involving an expenditure of over \$100,000, and claims the ability to compete with the world in points of design, workmanship, finish, adaptability and prices.

MASTER CAR BUILDERS' ASSOCIATION.

Proceedings of the Third Session of the Forty-second Annual Convention.

The president called the meeting to order at 9 a.m.

The secretary announced that at the meeting of the executive committee on Thursday, Dr. Charles H. Benjamin, dean of the school of engineering, Purdue University, had been proposed for associate membership by F. W. Brazier, William Forsythe, and George M. Dow. The executive committee approved of this and gives notice that a year from now a vote will be taken on the proposal of Professor Benjamin for membership.

The executive committee had approved the applications for life membership in M. C. B. association by W. H. Thomas and C. H. Cory, who joined the association in 1888. On motion of F. W. Brazier these recommendations of the executive committee were accepted.

The secretary presented the report of the auditing committee, which certified that the books of the secretary and treasurer had been examined and found correct. The report was on motion adopted.

The Secretary: At the meeting yesterday the question of the date when air brake hose should go into effect in the M. C. B. rules was referred to the executive committee. The committee decided to fix June 1, 1909, as the date in Rule 35 instead of September 1, 1908.

The report on "Heating and Ventilating of Passenger Cars" was presented by S. G. Thompson, chairman of the committee.

On motion the report of the committee was received and the thanks of the association extended to the committee for its work.

The next report was that of the committee on "Protective Coatings for Steel Cars," presented by J. E. Carson, chairman. On motion the report was received and the committee continued.

The committee on "Location of Ends of Running Boards" presented a very brief progress report, which on motion of Mr. Brazier was received.

The report of the special committee on "Standards for the Protection of Trainmen" was next presented by C. A. Seley, chairman, who recommended some minor changes in the report as printed.

F. W. Brazier (N. Y. C.): I move that the report of the committee be accepted and because of the short time that this matter has been considered, that it be referred to the executive committee, for the corrections recommended by the committee, and that the recommendations made by the committee be then submitted to letter ballot.

R. C. P. Sanderson (Virginian): I propose an amendment to the effect that the executive committee will be glad to have suggestions from the members as to modifications of the recommendations, to be received by the committee prior to July 6, 1908. That will give every one a chance to say what he has to say, after careful consideration, and in the best possible form, what he would otherwise wish to say here today.

Mr. Brazier: I accept the amendment.

The motion as amended was carried.

On motion the executive committee was directed to ap-

point a standing committee on "Standards for the Protection of Trainmen."

The report of the committee on "Box Car Doors and Fixtures" was then received.

R. L. Kleine (P. R. R.): I notice that the committee has done some very good work on these particular questions, but there seem to be a few points which might be further improved, such as the bottom door guide bracket. The present M. C. B. recommended practice shows the lip of these brackets very close to the siding and in that shape they are not so frequently broken off as they would be with a 3-inch extension bracket which the committee shows in its drawing. Furthermore the drop rail is but 3¾ inches in height, and that gives very little bearing for the top door hanger. The committee might go a little further and show the space of the bolts secur-

ing the top door hanger. The space is now so short between the bolts that the bracket easily becomes loose and when in that condition interfere with the rolling motion of the door. The handhold shows to be fastened by two screws and one bolt on each side. By adding a lug we could do away with the two screws and just add the one bolt. I therefore move that the committee be continued to consider this further recommendation.

D. P. Flory (Cent. of N. J.): The carriage bolts pull out easily. Lately we have been extending the door hasp staple so as to put in three bolts. I would like to make that suggestion to the committee.

F. F. Gaines (Cent. of Ga.): I want to confirm what Mr. Flory has said about the door hasp catch. There is another matter here to which I think the committee should give further attention. It shows on the bottom of the door a ¼ by 1¼-inch protection strip. That is not wide enough or securely fastened enough. Something a good deal more substantial on the bottom of the door is needed.

The secretary read a letter from Mr. Morse, chairman of the committee, in which he said: "If this report is adopted, in printing the new sheet F the door stiffener angles should be made 1¼ by 1¼ by 3-16-inch, as the size show, 1½ by 1¼ by 3-16-inch, is not standard angle.

The bolt holes on the closed door stops and the open door stops should be 9-16-inch square instead of 9-16-inch round, as carriage bolts will be used to secure these with the nuts on the inside of the car. Also, the bosses around the holes on the closed door stops, and the open door stops should be 1½-inch instead of 1-inch.

The Secretary: The motion before the house is that the report of the committee be received, the committee continued to consider the suggestions that have been made here this morning, and report again next year. Motion seconded and carried.

The report of the committee on "Tank Cars" was presented by A. W. Gibbs, chairman.

Mr. Gibbs added that he would recommend that the appendix be included with the rest, and said there were two things above all that were prominent in tank cars: (1) The means of securing the tank to the car without driving the end sills down. (2) The roll of the cars in causing external pressure.

On motion the report of the committee was received, the recommendations, including those in the appendix, directed referred to letter ballot, and the committee continued.



R. F. McKENNA,
President-Elect Master Car Builders' Association.

The report of the committee on "Subjects" was received and on motion referred to the executive committee for consideration.

The committee on "Resolutions" reported resolutions extending the thanks of the association to those individuals and associations (naming them) to whom the association was indebted for convention courtesies, which were adopted unanimously.

The convention then proceeded to "Topical Discussions" upon "The abuse of the repair card" and "Should journals of standard axles when fillets are partially worn be made longer in order to get in a full size fillet? If so, what should be the limit of the length of journals?"

On motion W. J. McKeen, Jr. (Union Pacific), who was not present, was invited to submit printed discussion on the subject he was to have opened—"Advantages and disadvantages of all-steel box cars."

The convention then proceeded to the election of officers. The secretary read the report of the committee of "nominations."

W. E. Fowler (Can. Pac.):—I would ask that that be referred back to the committee for reconsideration. I do not think it is necessary for me to say very much on this subject. I prefer not to. But I believe that if there is an emergency requiring this association to go back on all its precedents, it should be carefully considered in all its bearings. I was pained and astonished yesterday at the action taken by the committee, but I did not feel that yesterday was the proper time to say anything about it, but I think it would be wrong for me to allow this action to pass without making a protest against it. You are setting up a precedent now, if you adopt this report, that will be so far-reaching that no one knows where the end of it will be; and if you desire to wipe out all former precedent and well-established custom, let it be done in a thorough way and clean the slate.

On motion the secretary was directed to cast the ballot of the association for the ticket as reported by the committee on "Nominations," and published in our issue of June 19, page 219.

President Dow: I wish to thank you for the kindness shown and the support you have given me during the year, and at this convention, which I shall always remember. I also wish to thank Mr. Taylor, our secretary for his untiring assistance, and I take great pleasure in surrendering the office and gavel to so worthy a successor as Mr. McKenna.

The President-elect, R. F. McKenna was escorted to the chair and said:

Gentlemen: I want to express my appreciation of the honor conferred on me in electing me to preside over this organization. I rather regret the matter that has come up this morning, but do not desire to express any opinion on the subject. I do not know of any organization that it would be more of an honor, or a greater pleasure, to preside over than the Master Car Builders' Association. It is one of the few organizations to which are extended functions somewhat of a legislative character, and I wish to assure you that my very best efforts will be used in maintaining and upholding the present standing of the Master Car Builders' Association in the United States.

R. T. Walbank, president of the Railway Supply Manufacturers' Association was extended the privilege of the floor and said: I have never made a speech in my life. The Railway Supply Manufacturers' Association, which I have the honor to represent, receives great pleasure in getting orders and making prompt deliveries. Sometimes it is rather difficult to do either. In the last few months, the difficulty has been in the getting of them. Both Mr. Dow and I are men of few words, as the members of the association have found. I am commissioned to present you this medal, in token of our recognition of the services which you have rendered as president of the M. C. B. association, an office which you have filled to the entire satisfaction of your associates. I hope that you will have as much pleasure in receiving this medal as I have in presenting it to you.

Mr. Brazier: I do not desire to have this convention adjourn without saying a few words. In all probability, Mr. McKenna may be the last man with the title of master car builder to occupy the office of president of this association. Those of us who have been attending these conventions for the last 25 years and knew his father, can appreciate how fitting it is to have Robert F. McKenna as the last master car builder to fill the presidency. I believe the time is coming when the Master Car Builders' Association and the Master Mechanics' Association will be consolidated. The tendency of the day is towards consolidation, and I can see the handwriting on the wall. It is possible that there may be some feeling connected with the change but I think in the end it is the right thing to do. I move a vote of thanks to Mr. Dow for his faithfulness to the duties of his office, and

the satisfactory way in which he has discharged them during the past year. (Carried.)

C. A. Schroyer (C. & N. W.): I have been a member of this association for 22 years. I think it is about 40 years since this association was first organized, and I have no idea in the world that the handwriting on the wall implies anything that is going to obliterate this association. Whether as the Master Car Builders' Association or Master Mechanics' Association, or whether it may be under some other title, the objects and the aims of this association must go forward as long as the general business of this country is extended between the states, and it will be extended between the states as long as this country remains a union; and just so long will this association, whether it has the title it possesses to-day or another, continue to exist and perform the valuable service to the railroad interests of the country that it has performed in the past.

When this organization was first established there were no set methods by which the cars of freight were interchanged between the different roads. At that time all or most of the freight was transferred. The railroad officers of the country realized how important it was that there should be some rules established whereby the cars could be interchanged, and that result was brought about by this association. Do you know of any organization existing today in which the business of the organization is conducted wholly on the confidence that we have in each other, to the extent that it is in the M. C. B. association?

Mr. Schroyer: There is no organization in the world today where that is done. We take your cars from Maine to California, and you trust us with the operation and the maintenance of your cars, and when we say we have expended \$10 on the maintenance of your car, you believe us and you pay the bill on the strength of the card that goes to you showing what work has been performed on that car. Is there any other organization in the country in which that is done?

We must not underestimate the influence and the power of this organization. Is there anything in the Master Mechanics' association (which some of our members claim is going to absorb us) which equals in importance, from a practical standpoint, the objects to which we have given our attention? Is there any reason why this organization should be absorbed by that organization? Is there not every reason in the world why their organization should be absorbed by this association? While it is true, in many cases, that as master car builders we are subordinate to the superintendents of motive power and the master mechanics, we might just as well have an organization called "Superintendents of Motive Power Association," so I do not think that we should be disheartened simply because we may, in the near future have to be joined with the other association. I think it would be a good thing if we could take up the car business one day and locomotive practice the next. We have established standards and conditions on which congress has based some of the federal laws. I believe there is still a career of great usefulness before an association dealing with the subjects which have been considered in our association.

Adjourned.

Rosenberg Generator Train Lighting Equipment.

A trial car of the government railroads of Austria-Hungary, provided with the Rosenberg generator train lighting equipment is reported to have been giving satisfactory results. The car contains six compartments of the first and second class, each of which is equipped with two koloid-tungsten lamps of 16 candle power each. There are also installed four additional 16 candle power lamps in the corridor and one lamp in each of the toilet rooms. The lamp potential is 32 volts, while the Rosenberg generator is designed for a potential of 44 to 58 volts and a capacity of 30 amperes. A storage battery designed to supply all lamps during six consecutive hours is installed. To avoid winking of the lamps when changing from generator to storage battery current supply there are provided iron ballast resistances of the cartridge type which are connected in series to the incandescent lamps and are mounted in the corridors to facilitate their renewal in case of burn outs. The field rheostat, which serves for adjusting the current input while charging the storage battery and the automatic reverse current relay which prevents the back feeding of the storage battery into the generator during the retardation periods of the train, are also mounted in the corridor. The light was reported to be very steady and agreeable and not to show any flickering during the critical speed intervals, that is, when starting and slowing down of the train. It is reported that the Belgian government recently made extensive trials with use of Osram lamps for trainlighting purposes, which have been entirely satisfactory as regards illumination as well as low current consumption.

Conventionalities

PROGRAMME—MASTER MECHANICS' CONVENTION.

First Session.

Monday, June 22, 1908, 9:30 a.m. to 1:30 p.m.

Prayer	9:30 a.m. to 9:35 a.m.
Address of president	9:35 a.m. to 10:00 a.m.
Intermission to allow visitors to retire, although all are requested to remain	10:00 a.m. to 10:05 a.m.
Action on records of 1907 convention	10:05 a.m. to 10:10 a.m.
Reports of secretary and treasurer	10:10 a.m. to 10:20 a.m.
Assessment and announcement of dues; appointment of committees on "Correspondence," "Resolutions," "Nominations," "Obituaries," etc.	10:20 a.m. to 10:25 a.m.
Election of auditing committee	10:25 a.m. to 10:30 a.m.
Unfinished business	10:30 a.m. to 10:35 a.m.
New business	10:35 a.m. to 10:45 a.m.
Discussion of reports on:	
"Mechanical Stokers"	10:45 a.m. to 11:00 a.m.
"Blanks for Reporting Work on Engines Undergoing Repairs"	11:00 a.m. to 11:15 a.m.
"Proper Width of Track on Curves to Secure Best Results with Engines of Different Lengths of Rigid Wheel Base"	11:15 a.m. to 11:30 a.m.
Discussion of individual paper by Law-Ford H. Fry, on "Design and Strength of Crank Axles for Balanced Compound Locomotives"	11:30 a.m. to 12:00 m.
Topical discussions:	
(1.) "Alloy steel; results from use in machine tools and special cutters." To be opened by J. A. Carney	12:00 m. to 12:30 p.m.
(2.) "The smoke nuisance; what is the best method of preventing it?" To be opened by H. T. Bentley.	
Discussion on report on "Washing Out and Refilling Locomotive Boilers"	1:00 p.m. to 1:30 p.m.
Adjournment.	

Mrs. S. W. Midgley lost her guest badge, No. 5000. Finder will please return to the Supply Men's registration booth.

Thomas Aldcorn has lost his executive committee badge number 6006. Will finder please return to registration booth of the supply men?

Angus Sinclair, Doc. Eng., will arrive at the Traymore Hotel Friday evening. He would be glad to hear from some one on a golf proposition for Saturday.

W. J. McGee, master mechanic of the Tampa Northern Railroad, arrived on Friday and is quartered at the Traymore. He at once made application for membership in the A. R. M. M. Association.

"Doc" W. H. S. Bateman, sales agent for the Parkesburg Iron Company and the Champion Rivet Company, is all smiles. Mrs. Bateman came down from Philadelphia yesterday to attend the convention.

The reunion and dinner of the Society of Railway Club Secretaries is to be held this evening at the Windsor hotel. The annual meeting of the society occurs at 10 o'clock this morning in room 164, Hotel Brighton.

When a man sees the error of his ways, repents, reforms and takes the action necessary to rehabilitate himself, great joy fills his own heart and that of his friends. This is the case with John G. Clifford, master mechanic of the Louisville & Nashville at Louisville, Ky. Mr. Clifford has been a member since 1874 but has not been present at a convention since 1882. He is scheduled to arrive today.

W. S. Airs, president of the St. Louis Surfacers & Paint Company, St. Louis, is attending the convention and is stopping at the Marlborough-Blenheim and in fact "stopping" all over to remind his friends that "Sandey" is again on the job.

Herbert Self, of the Crandall Packing Company, New York, who was on the entertainment committee for eight years, has been unable to attend the conventions this year, but he will spend Sunday in Atlantic City, where all visitors at the conventions will be glad to see him.

The annual convention of the Freight Claim Association is being held at the St. Charles Hotel, Atlantic City. Over 180 railroads are represented either by their own officers or by proxies. Between sessions the members are viewing the exhibits and attending the social functions incidental to the mechanical conventions.

W. J. Caton, eastern manager of the American Lumber & Manufacturing Company, Pittsburg, has no exhibit this year. He would not be able to attend to it properly if he had, as his duties as a member of the transportation committee keep him constantly employed at the rolling-chair station at the entrance to the pier.

The secretary announced at the close of the meeting on Friday that the registration office for members would be open on Saturday afternoon and Sunday morning for the registration of members of the M. C. B. Association who are also members of the Master Mechanics' Association, in order to avoid any possible delay in the registration on Monday.

H. N. Turner, who has attended the conventions for so many years in the interest of the Acme White Lead & Color Works, is here this year as general sales manager for the St. Louis Surfacers & Paint Company of St. Louis. The company's exhibit is in the booth of the U. S. Metal & Manufacturing Company, where much "paint" talk may be heard.

It's not a moving picture show but a moving sign show that is being used to attract people to the booth of the Duff Manufacturing Company. It is so arranged that one may read as he runs if he hasn't time to stop on the first round. Thos. A. McGinley, vice-president of the company, is always on hand to welcome visitors, assisted by George A. Edgin and E. M. Fisher.

L. J. Hibbard, formerly inspector and representative in the Eastern territory of the American Brake Shoe & Foundry Company, has resigned from that company and has established the firm of L. J. Hibbard & Co., to handle a line of engineering and railway supplies. In his honor a party was given by several friends on the morning after the ball. Mr. Hibbard plays to-day on the ball team.

The article on the steel mail and baggage cars for the St. Louis & San Francisco in the Railroad Age Gazette of June 18, page 133, describes the cars as being covered with wooden siding. This portion of the article was written before the details were received from the Pullman Company, and should be corrected to read that the exterior and interior are furnished with steel sheathing as stated later in the description.

There is a special slack adjuster at the exhibit of the Chicago Railway Equipment Company which is creating considerable interest and should be seen by both railroad officers and supply men and the ladies. This special feature of the exhibit is artistically decorated in both natural and artificial tints and perfectly harmonizes with the rich effect of the general maroon and tan color scheme of the entire exhibit. The above described portion of the showing made by the company is not a manufactured product but nevertheless bears the well known "Creco" trademark. It has been named the

Timothy Stanley Higgs slack adjuster. Mr. DeLong, Mr. Williams or Mr. Leigh will furnish records of service tests and price lists.

Four able representatives of the Sherwin-Williams Company are here. They are W. B. Albright, E. M. Richardson, Thomas Madill and J. H. Eames. Although times are hard these gentlemen are getting their share of business. Since their arrival at Atlantic City to attend the conventions they have received from the home office the figures showing the business of the Sherwin-Williams Company for the month of May. It is rather surprising to note that the total business for last month was in excess of the total business of the previous month, and largely in excess of that transacted during the corresponding month of last year. W. H. Cottingham, vice-president and general manager of the Sherwin-Williams Company, sails for Europe June 24 on the "Mauretania," to be gone until September 1.

The suits for the baseball teams who will meet on the diamond this afternoon have arrived and those allotted to the railroad men's team will be particularly neat and attractive. The uniforms are all dark blue trimmed with white, having "R. R. Men" in large white letters and "M. M. & M. C. B." in smaller letters upon the shirt front. The stockings are blue with white stripe. The supply men will content themselves with the same uniforms which were worn last year and those who played in the eastern and western teams will wear suits which were worn by them last year. The uniform of the eastern men is grey with red trimmings and of the western men tan with blue trimmings. Fourteen men will wear the uniforms of each team. Captain Midgley reports that the supply men are in excellent form and if they are beaten it will be by extraordinary playing on the part of the railroad men unless, as has been basely insinuated, the umpires have been subsidized.

A committee of ladies has been organized to further the sociability of the convention by introducing ladies who are not widely acquainted. Any lady who wishes to be introduced is at liberty to speak to any member of this committee, who may be identified by the ribbon badge made to represent a wild rose, the leaves of which are lettered "M. M. & M. C. B.—1908."

The committee includes the following: Mrs. Dow, Miss Dow, Mrs. McIntosh, Miss McIntosh, Miss Ethel McIntosh, Mrs. Fowler, Miss Fowler, Mrs. Deems, Mrs. O. M. Deems, Mrs. Hopkins, Mrs. Pearsall, Mrs. J. F. Walsh, Mrs. Pratt, Miss Pratt, Mrs. Noble, Mrs. Marshall, Mrs. Moran, Mrs. Brazier, Mrs. F. O. Brazier, Mrs. Whipple, Mrs. Ross, Mrs. Walbank, Mrs. Charles P. Storrs, Mrs. Midgley, Mrs. Wildin, Mrs. Molleson, Mrs. F. H. Clark, Mrs. Stayman, Mrs. W. H. Miner, Mrs. La Bonta, Mrs. Dunkelberg, Mrs. Garstang, Miss Garstang, Miss Moran, Mrs. Weatherley, Mrs. Ramsdell, Mrs. Howard, Mrs. Rhodes, Mrs. Burnett, Miss McKenna, Mrs. C. B. Fuller, Mrs. Chambers, Mrs. Courtney, Mrs. Blanchard, Mrs. George Moses, Mrs. Mitchell and Mrs. Meek.

At the instigation of representatives of a number of prominent supply houses, an invitation has been extended to Hon. George A. Post to address the annual meeting of the Railway Supply Manufacturers' Association to be held this morning at 11 o'clock in the Greek Temple on the pier. The subject suggested to Mr. Post as a suitable one for the occasion, though not formulated in precise terms, will doubtless have some relation to the present state of industrial affairs. The well-known belief of the speaker with reference to taking a cheerful view of the most cloudy situation, the evidences of prosperity as exemplified at this convention and as to some extent in evidence in nearly all sections of the country, and his unsurpassed skill in the use of words fitly chosen, all combine to afford assurance that those who attend the meet-

ing will come away impressed with the belief that the clouds are rolling away, the glad hand is coming out of its trousers pocket seclusion, sliced oranges will take the place of lemons and breakfast food the place of sawdust on the breakfast table.

Miss Lucine Finch, who will appear in the ball room of the Marlborough-Blenheim tonight with unpublished negro stories and songs, gives a unique entertainment both because she is an accomplished young actress and because she acquired the materials for her performances in a unique way. Miss Finch is a Southern woman. Her negro mammy, who died in New Orleans at the age of 90 a few years ago, had been sold into bondage from Africa, and used to tell the children whose nurse she was, that her father was an African king and she "an Alabaster princess." She had a wonderful gift of narration, a rich sense of humor and a peltic instinct for the grotesque, weird and horrible. On Sunday evenings she used to tell the children what she called "ligious stories." They were not funny to her or her small auditors, but as retold now by Miss Finch they convulse with mirth every audience that hears them. Miss Finch has no theatrical airs, but dressed simply, she sets in an armchair and bending toward her audience in an intimate way reels off story after story and song after song in a rich, unctuous voice, and with a picturesqueness of gesticulation that is the best and most amusing kind of acting. Mr. Charles Safford will also appear in musical monologues, and it is believed the entertainment will be one of the best incident to the conventions. Informal dancing will follow.

Annual Meeting, Railway Supply Manufacturers' Association.

Attention is again called to the time of the annual meeting of the Railway Supply Manufacturers' Association. This meeting will be held on Saturday, June 20, in the Greek Temple, Young's Million Dollar Pier, at 11 a. m.

Purdue Dinner Tonight.

Representatives of Purdue university, including members of the faculty, alumni and students, will hold a convention dinner at 7:30 p. m. this (Saturday) evening at the Marlborough-Blenheim hotel. The party will meet in the rotunda, first floor of the Blenheim building, at 7:15 p. m. Purdue has an unusually large representation at the conventions this year and a pleasant gathering is anticipated. Dr. W. F. M. Goss, formerly dean of the school of engineering at Purdue, and members of the present faculty, will be present.

Members of Manufacturers' Executive Committee.

Editors Railroad Age Gazette:

At a meeting of the Railway Supply Manufacturers' Association, held today, the following resolution was adopted:

"RESOLVED that section 3 article 2 of the by-laws shall be construed to mean that any person elected to represent any district on the executive committee must be a resident of said district, and if he shall, after election, remove his residence therefrom, his membership on said committee shall become vacant."

Please announce this interpretation in your paper.

E. G. SMITH,

Secretary.

Atlantic City, N. J., June 19, 1908.

Cornell Dinner.

The annual dinner and general round-up of the Cornell men attending the conventions will be held at the Windsor on Saturday evening 8:30. A well known quartette from New York which holds an enviable reputation for excellence among music lovers, will, through the kindness of John H. Thomas, be present. C. L. Safford has promised to drop in as soon as his engagement at the Marlborough-Blenheim

will permit and will help to keep things lively. John Barnes Wells and other professional entertainers of international reputation are expected to be present and help to keep the ball rolling. The price has been set at \$5.00 a plate and it is requested that all Cornell men register at the booth of the American Engineer and Railroad Journal as soon as possible in order that some definite idea may be obtained as to the number to be arranged for. The dinner will be strictly informal in every way.

Victor Herbert's Orchestra.

Following was the programme for the concert by Victor Herbert's Orchestra in Entrance Hall last evening:—

- 1 OVERTURE—"The Red Mill"
- 2 a. "Yesterthoughts"
- b. "Forget me not"
- c. "Badinage"
- 3 SONGS—"If only you were mine, Love," "Love is Tyrant;"
From "The Singing Girl." Mary Jordan FitzGibbon
- 4 IRISH RHAPSODY—(Motto—"Erin, Oh Erin")
- 5 OVERTURE—"Mlle. Modiste"
- 6 a. Toy Soldiers' March from "Babes in Toyland"
- b. "Because You're You" from "The Red Mill"
- c. Sextette from "Babette"
- d. Oriental March from "The Tattooed Man"
- 7 SONG—"The Silent Rose;" Mary Jordan FitzGibbon

New Members Manufacturers' Executive Committee.

The meetings of the members of the third, fourth, fifth and sixth districts of the Railway Supply Manufacturers' Association were held yesterday afternoon in accordance with the announcement published in yesterday's issue of the Railroad Age Gazette and resulted in the election of the following:

Samuel G. Allen of the Franklin Railway Supply Company and E. M. Grove of the McConway & Torley Company to succeed George N. Riley and Frank L. DeArmond, for the third district.

S. P. Bush of the Buckeye Steel Castings Company for two years to succeed A. G. Hollingshead of the fourth district, who resigned owing to a change of residence.

L. R. Phillips of the National Tube Company to succeed R. T. Walbank of the fifth district, who has just retired from the presidency of the association. The meeting adopted with enthusiasm the following resolution:

Resolved, That it be the sense of this meeting that the thanks of the members of the fifth district be extended to R. T. Walbank, who has so ably represented the district on the executive committee with such distinction and honor to his constituents, and that the secretary be instructed to present Mr. Walbank with a copy of this resolution.

A. C. Langston of Jenkins Bros., to succeed L. O. Cameron of the sixth district.

The annual meeting of the association will be held in the Greek Temple on the Million Dollar Pier at 11 o'clock this morning for the purpose of electing a president, a vice-president and a treasurer, all of whom must be selected from among the members of the executive committee, which, with the elections of yesterday, is now constituted as follows:

First district: (New England States, 1 member) Frank A. Morrison, Mason Regulator Company.

Second district: (New York and New Jersey, 3 members) Alex. Turner, Galena-Signal Oil Company; A. L. Whipple, Forsyth Brothers Company, and Thomas Aldcorn, Chicago Pneumatic Tool Company.

Third district: (Pennsylvania, Maryland, District of Columbia, West Virginia, 2 members) Samuel G. Allen, Franklin Railway Supply Company and E. M. Grove, McConway & Tooley Company.

Fourth district: (Ohio, Indiana, Michigan, Kentucky,

Tennessee, 2 members) George A. Cooper, Frost Railway Supply Company, and S. P. Bush, Buckeye Steel Castings Company.

Fifth district: (Illinois, Wisconsin, Iowa, Minnesota, 2 members) W. H. Miner, W. H. Miner Company, and L. R. Phillips, National Tube Company.

Sixth district: (Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, 1 member) A. C. Langston, Jenkins Brothers.

Seventh district: (States west of Mississippi river, including Louisiana, but excepting Iowa and Minnesota, 1 member) R. H. Weatherly, Scullin-Gallagher Iron Company.

The Baseball Game.

In convention on Friday morning Secretary Taylor announced the event of which mention has been made before, viz.: That there will be a baseball game to-morrow afternoon between the railroad men, representing the Master Mechanics' and Master Car Builders' associations, and the supply men, representing the Railway Supply Men's Association. This great event will take place on Saturday afternoon at 3 p.m. at the Atlantic City baseball park, which is located at the Inlet. Special cars will leave for the game at 2:30 p.m. from South Carolina avenue and the Boardwalk. There will be a parade, starting from the Marlborough-Blenheim Hotel at 2:00 o'clock over to Young's Million Dollar Pier through the exhibits. This parade will be composed of the Railroad Men's band, the Supply Men's band, the ladies who have charge of the score cards and the two baseball teams. It is hoped that all railroad men present will be loyal and turn out en route with their team, the names of which will be published in Saturday morning's Age Gazette. Members of the railroad baseball team are requested to be at the Blenheim hotel not later than 1:30 to dress for the occasion. It will add to the interest of the game that the score cards will be complete with names and positions of the players. Following is a list of players of the two teams in batting order:

Batting Order, Railroad Men's Baseball Team.

1. T. P. Hinckley, (s. s.) C. H. & D.
2. H. E. Passmore, (2nd b.) T. & O. Cent.
3. Geo. W. Wildin, (captain) (1st b.) N. Y. N. H. & H.
4. Frank Tuma, (p.) Erie.
5. I. S. Downing, (c. f.) L. S. & M. S.
6. E. I. Dodds, (3rd b.) Erie.
7. Wm. Schlafge, (l. f.) Erie.
8. H. C. Oviatt, (c.) N. Y. N. H. & H.
9. Geo. N. Dow, (r. f.) L. S. & M. S.
10. W. Kells, (r. f.) Lehigh Valley.
11. T. H. Goodnow, (sub. f.) L. S. & M. S.
12. W. L. Wilt, (sub. infielder) Penn.
13. A. LaMar, (sub. f.) Penn.
14. S. G. Thompson, (sub. f.) Penn.

Umpires: T. B. Purves, Jr., D. R. G.

Frank A. Barbey.

Batting Order, Supply Men's Baseball Team.

1. C. H. Carmen, (l. f.) Rutherford Automatic Connector Co.
2. T. W. Driver, (c.) Patton Paint Co.
3. S. W. Midgley, (captain) (2nd b.) Curtain Supply Co.
4. L. J. Hibbard, (s. s.) L. J. Hibbard Co.
5. M. R. Jackson, (3rd b.) Schoen Steel Wheel Co.
6. E. J. Sawyer, (1st b.) Commercial Acetylene Co.
7. J. D. Ristine, (c. f.) Lowe Bros. Paint Co.
8. G. E. Gernon, (p.) Gisholt Machine Co.
9. C. Spalding, (r. f.) Gisholt Machine Co.
10. Geo. J. Chandler, (sub. f.) Sterling Steel Foundry Co.
11. H. Doran, (sub. f.) Commercial Acetylene Co.
12. C. J. Symington, (sub. f.) T. H. Symington & Co.
13. R. C. Vilas, (sub. f.) Pyle Nat'l Electric Head Light Co.
14. Frank Martin, Jenkins Bros.
15. C. S. Parker, Jr., (sub. f.) Parker Car Heating Co.

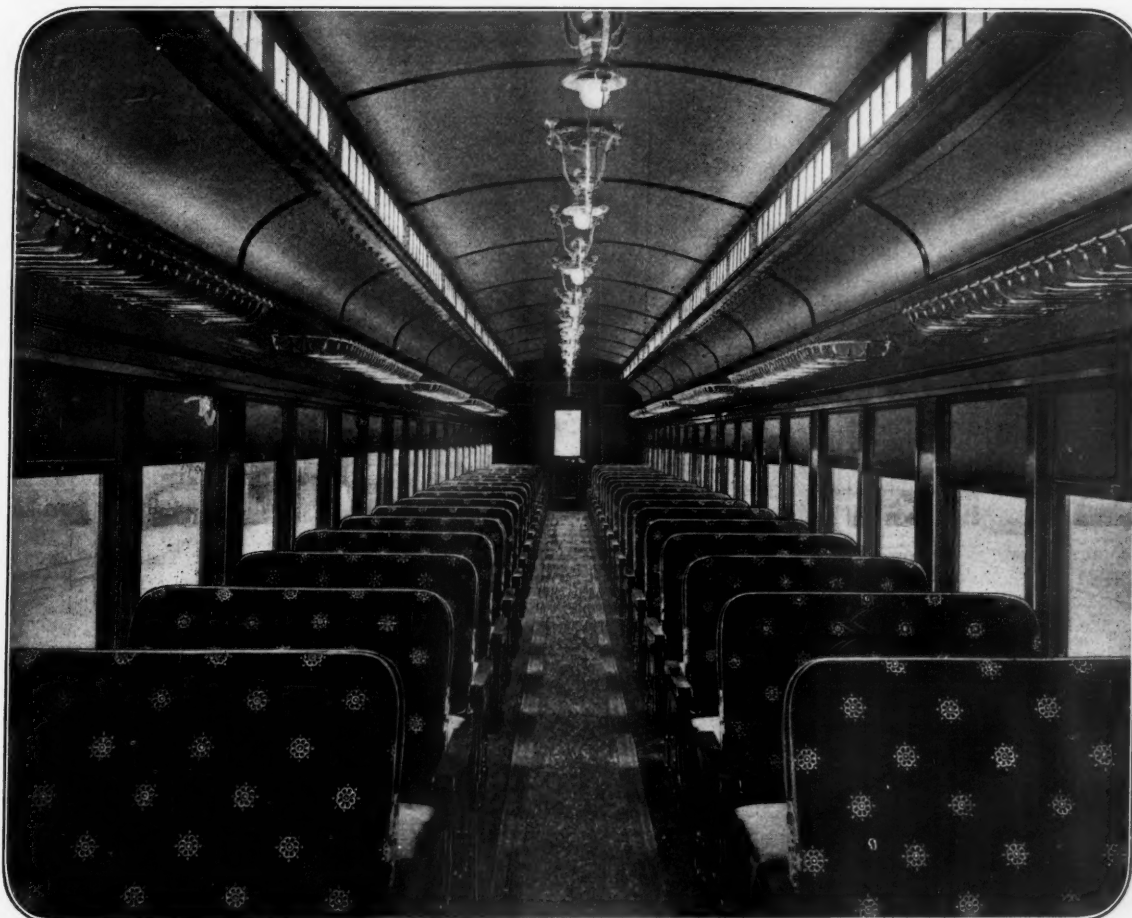
THE PENNSYLVANIA STEEL COACH.

The Pressed Steel Car Company is exhibiting one of the steel passenger cars of which it is at present delivering to the Pennsylvania Railroad on an order of 85 cars. The design was prepared by the Pennsylvania Railroad.

This car is non-combustible, no inflammable material being used except for the window sash and seat arm rests, which are of mahogany and which in weight represent about two-tenths of one per cent of the entire car. These cars have the distinction of having less wood in their construction than any coaches ever built in this country for use on a steam railroad and it may well be claimed that they are the first all-steel cars built for this kind of service, since the small

The general scheme of construction is to carry the whole weight of car on the center sills which are of sufficient strength to resist excessive buffing loads. These sills consist of two rolled channels 18 inches deep, spaced 16 inches apart and tied together at top and bottom with cover plates $\frac{1}{2}$ by 24 inches, the combination producing a cross area of 50 square inches throughout the length of the car. This girder is set at such a height as to permit the draft gear to be placed between the center sills near their center line, thus providing for the buffing and pulling stresses to be transmitted in a direct line through these sills.

The superstructure is carried by side girders formed of the side sheathing below window sills with the side sill



The Pennsylvania Steel Car—Interior.

percentage of non-inflammable material is not a part of the structure but merely a part of the trimming.

The car has a seating capacity for 88 passengers and weighs complete 113,800 pounds, which includes storage batteries weighing 5,800 pounds. It is interesting to note that the dead weight per passenger is about 1,290 pounds which compares favorably with a modern wooden coach if such cars are equipped with the same specialties and storage batteries as used on this car. The weight of wooden cars average about 1,450 pounds per passenger. From this it will be noted that by taking the average weight of a passenger as 160 pounds, which is a high average, the steel car loaded to its full capacity will weigh no more per passenger than the empty wooden coach of the same length.

The general dimensions of the car are as follows:

Length over buffer face plates.....	80 ft. 3 $\frac{3}{4}$ in.
Length over body corner posts.....	70 ft. 5 $\frac{3}{4}$ in.
Length inside	69 ft. 7 $\frac{3}{4}$ in.
Width over side sheathing	9 ft. 9 $\frac{3}{4}$ in.
Width inside	9 ft. 1 $\frac{1}{8}$ in.

angle, 5 by 3 $\frac{1}{2}$ by 9-16 inch, as a bottom chord and the belt rail forming the top chord, the latter is a special section of an area approximately the same as the bottom chord. This girder is stiffened vertically by the side posts which extend to the bottom of the same.

No body bolsters are used, the side girder loads being transferred to the center sills through the body end sills and two cross-bearers, they being located respectively the same distance in front and back of the center sill support or truck center, which produces a balancing effect of the transferred concentrated loads and obviates the possibility of any stresses coming into the superstructure by the deflection of the center sills. Each side girder is further tied to the center sills with eight 5-inch channels which do not transmit any of the vertical loads, but act as braces to keep the side sill in line.

The floor is formed of Karbolith, a non-inflammable material, 1 $\frac{1}{2}$ inches thick, laid on top of corrugated steel sheets which are supported at the center sills and side of car. The sub or false floor is made of asbestos board bound with gal-

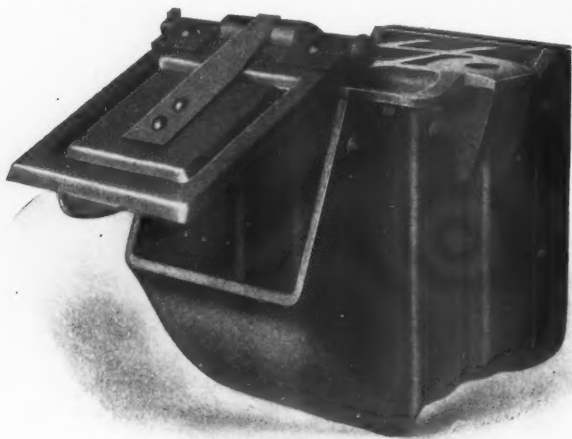
vanized sheet steel. Composite board, a non-inflammable material, is used for the headlining at ceiling; the rest of the inside finish is of steel having a layer of 3-16 inch Cellinite glued to the unexposed surfaces for the purpose of insulation. The outside finish, roof covering and steps are of sheet steel of from No. 16 to No. 11 gage.

Four-wheel trucks with 5 by 9-inch journals are used. These are all-steel and of a special construction to accommodate the deep center sills, the lower surface of which are but 30 inches from the top of the rail. The particular features of these trucks which differ from the usual construction are the extension of the bolsters under the side frames; the location of the side bearings outside of the side frame for the purpose of meeting the body side bearings which are located under the side girder as there are no body bolsters used, and the supporting of the truck bolsters which are hung from the side frames by hangers and gibs similar to the arrangement for hanging the side frames of locomotives.

The following is a list of the specialties and special features used in these cars: Pennsylvania Railroad standard ventilating system, Gould booster system of electric lighting, Westinghouse air brakes and train signal, American Brake Company's slack adjusters, Polar couplers, Pennsylvania Railroad coupler centering device, Curtain Supply Company's Pantasote curtain, Hale & Kilburn Company's steel doors, Westinghouse friction draft gear, Lindstrom brake handles, Consolidated steam traps, Safety steam couplers, Willard storage batteries, Universal safety tread, Ajax vestibule diaphragms, Edwards' window balance and trap door fixtures, Hale & Kilburn's pressed steel framed seats, Pennsylvania Railroad standard basket racks, Schoen rolled steel wheels.

KENSINGTON JOURNAL BOX.

The accompanying illustrations show two styles of an all steel journal box, made by the Union Spring & Manufacturing Company, Pittsburg, Pa. The originals from which these photographs were made are on exhibition in booth 434-436. This journal box incorporates a number of special features which are unique and substantial. The sides, front, bottom and back are included in a single steel pressing; the dust guard pocket is of pressed steel, while the top of the



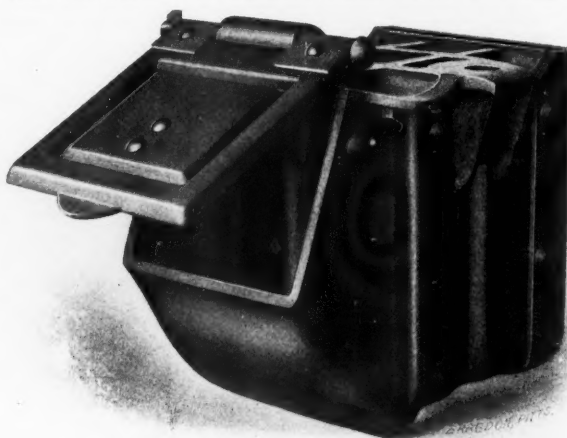
Kensington Journal Box—Outside Spring.

box is a steel casting, making a simple, compact construction with but three separate pieces in the box. The dust-proof lid, also a steel pressing, is made in two styles, inside and outside springs. The box is adapted to the use of any M. C. B. standard journal box lid. A feature of the top of the box being a separate casting is that it affords an absolutely true bearing surface for the wedge. Any irregularities of the casting may easily be ground off. The difficulty usually met in this regard with the ordinary one piece cast box is entirely

obviated. A continuous corrugation, seen near the front of the box, affords the additional strength necessary to resist all lateral thrusts. A very ingenious method is employed in slotting the ribs of the top casting which support the arch bar bolt lugs and inserting the sheet of the steel box into the slots, thus taking all strain off of the rivets. The corrugated fits for receiving the arch bar bolts also add to the strength of the box as does the above mentioned continuous corrugation.

LANDIS TOOL EXHIBIT.

The Landis Tool Company of Waynesboro, Pa., exhibits in operation its new design of Universal tool grinder for railroad tool rooms, the machine being driven by a self-contained



Kensington Journal Box—Inside Spring.

electric motor of 1½ horsepower. This new machine is used for both internal and external grinding. It has the usual taper attachment and is also adapted to face and surface grinding. It has a special attachment for grinding the inside of the flutes of reamers. A new and ingenious feature of this machine is the large bowl for holding the water and the column to which the wheel is attached comes up through the center of this bowl. The machine has a capacity of 8-inch swing and for pieces 18 inches long, and the emery wheel is seven inches diameter and half inch thick. This machine will be found of interest by master mechanics, as it contains quite a number of new features in addition to those described.

The same company also exhibits its regular No. 3 Universal grinder, which uses a 14-inch wheel of 1¼-inch face. This machine is also useful for railroad shops and tool rooms, and is especially adapted for the long reamers used for main frames and cylinders, also for long bolts and similar locomotive details. It is provided with a steady rest and an attachment for grinding gear cutters and side milling cutters. The machine can be fitted with a magnetic clutch for grinding piston rings and other similar details. It is belt-driven and has a friction gear for the transverse drive.

The same company exhibits a rather curious collection of steel shavings resulting from heavy grinding on its machines. These shavings are the full width of the wheel and have an average thickness of 1-64 inch, and they resemble the thin shavings produced by a broad lathe tool. They are interesting as showing heavy and rapid work done by the grinding machine which produces them as the steel is removed by the wheel so rapidly that it is fused into the continuous shaving and the large volume of water, 20 or 30 gallons per minute, which is forced against the wheel at the point of grinding prevents the hot particles from being deposited upon it.

Holders of railroad certificates entitling them to a reduced rate for the return trip should deposit them with Secretary Earl G. Smith at the earliest possible date.

VENTILATING AND HEATING OF COACHES AND SLEEPING CARS.*

The principles involved in this subject are so broad, the variations of the conditions so great, and the state of the art so undeveloped, that the committee considered it best to limit its investigation and suggestions to general lines, and not to include any more detail than was necessary to illustrate some of the important principles, and to describe a few of the best methods in use. With this consideration in view, the committee communicated with the men at the heads of the mechanical departments of 50 of the largest railroads in the country, asking for their views on the subject, and for a description outlining the construction and operation of the good heating and ventilating systems and devices with which they were familiar, and which had been tried out sufficiently to show some merit. There was also submitted with this inquiry to these gentlemen, a list of questions which were thought to be pertinent to the subject, and which might serve as texts in bringing out arguments and suggestions along the lines in which it was thought desirable to develop. The result of this inquiry was that 30 replies were received, some of which contained very useful information and suggestions, while others merely consisted of a vote on the questions, without any discussion. Very few of these replies made any mention of new or successful ventilating apparatus in operation on their roads, or in use anywhere with which they were familiar.

The committee review the history of investigations into this subject, citing the report to the association in 1874 by W. E. Chamberlain and A. Gleason, the report to the association in 1894 by another committee, the investigations by Prof. W. Ripley Nichols of the Massachusetts Institute of Technology some 40 years ago into the Winchell ventilating system, the Spear stove system, the deck sash ventilating system now commonly used, the Pennsylvania Railroad standard ventilating arrangement, the Pullman ventilating system and the Garland ventilator (The Railway Age, December 28, 1906, page 817).

The report continues with a reference to the system of the Automatic Ventilator Company used for about five years on the Central of New Jersey, which has some 400 cars equipped with the device. The Delaware Lackawanna & Western has 40 cars with this ventilator and experimental installations and tests have been made on a number of other roads which have installed the device on from one to eight cars. Among these the following roads have made tests which have been presented to the committee: Wabash, Long Island, Duluth & Iron Range, Chicago Milwaukee & St. Paul, New York New Haven & Hartford, Canadian Pacific, Grand Trunk, Interborough-Metropolitan.

A section of this ventilator is shown in the accompanying engraving. It is arranged to be substituted for the regular deck sash; or, in cases where it is desired to have an opalescent or other decorative inside sash as a part of the interior finishing of the car, the ventilator can be arranged outside of the sash, and so constructed that the opening of the deck sash will open the ventilator. The device also can be arranged to extend through the car roof, and may be adapted to a car with any design of upper deck. The general arrangement of it is always the same, and consists of two openings or ducts extending into the car, each about 4 by 6 inches in size, with a deflector located between them and extending outwardly at right angles to the panel through which the ducts pass. The proper shutters, screens and other details are provided for controlling the device, and for the exclusion of dirt, cinders and rain. The end of the deflector is bent so as to scoop the air into the forward duct and to exhaust it from the rear duct. Some of the tests show that about 100 cubic feet of air per minute enters the intake side of one ventilator and 116 cubic feet is drawn out of the exhaust side, while running at speed. Tests are now being made to determine the extent that the air is changed in the lower part of the car. These tests involve very careful analysis of air at different heights and in different parts of the car and should show the proportion of air that descends to the passengers as well as the portion that enters one side of a ventilator and is immediately drawn out from the other side of the same ventilator, or from a ventilator in the deck across the car. A considerable difference in temperature between the outgoing and the incoming air, as has been shown by the numerous tests already made, would seem to indicate that an effective circulation is maintained down through the body of the car. A panel ventilator of this kind has been constructed to take the place of a screen in the lower berth of a sleeping car, the thought being that the occupant could ma-

nipulate it to admit air to the berth, or to exhaust it from the berth, as he might desire.

The three representative types of ventilators which have been in service sufficiently long to prove their merits and their failings are: Pennsylvania system, the Pullman or deck sash system, and the Central of New Jersey system. The first one is a balanced intake and exhaust system in which the air is warmed before it enters, and must pass through the body of the car before it is exhausted. The second is either a combination admission and exhaust deck-sash arrangement, or, in its later developments, is strictly an exhaust system without any special intakes, in which case the air enters wherever it can and is drawn to the upper deck from all parts of the car. The third system is a combination admission and exhaust arrangement located in the upper deck, with a special ventilator arranged to force and to regulate the air circulation. The first system involves the indirect method of heating, while in the other two arrangements the air is heated by radiators after it is in the car. All other arrangements in use are modifications or combinations of these principles, except the forced-draught or fan system.

The Chicago & North-Western has modified the old Spear stove system, which was the early form of ventilation used in its coaches, by replacing the stoves with large radiators located immediately inside of the end doors of the car, where, in addition to its function as a ventilating air heater, its radiating effect can be used to counteract the cold blasts from the door. The air for the ventilating system is scooped into the jack on the roof and forced down through the body of the radiator, and then distributed to the car body. So also it will be found that the various other systems embrace portions or combinations of the principles already illustrated; and for this reason it seems unnecessary to describe the many other modifications which may be in use.

The committee next presented a few arguments based on ten general questions involving proposed improvements, with suggestions and conclusions with reference to them.

(1) Is it possible to have a satisfactory passenger car ventilating system separated from the heating system; or, in other words, should the air be heated after it is in the car by radiators or by other direct means of heating, or should the indirect method be used in heating the air before it is admitted to the car?

It is the opinion of the committee that, for a given amount of air movement through a car, this air can be heated more satisfactorily and with less steam by the indirect method, than it can by the direct method, on account of a better circulation being maintained around the steam pipes by the indirect system; therefore, it would recommend that the indirect method of heating be used for all new equipment, and for such present equipment as it is practicable to change from the direct to the indirect system. For such coach equipment as it is not expedient to change to the indirect system of ventilation, your committee suggests that extended experiments be made with combination admission and exhaust ventilators located in the upper deck.

(2) Can the down-draught system as used in buildings be applied satisfactorily to passenger cars by admitting warm air overhead, to become diffused through the car as it gradually cools off and drops to the breathing line and to be removed from the car at the floor?

The committee does not recommend the down-draught system of ventilation for any kind of passenger equipment.

(3) Do we need a forced-draught system such as might be constructed by electric exhaust fans or blowers, and are the failings of our present system sufficient to warrant this extra expense in any of our passenger equipment?

The committee does not believe that the fan or blower system would be warranted for all regular equipment, since it would be too expensive to install, and since it could not be maintained in good condition by the ordinary attention that it would receive from the porters and train crews.

(4) Would it be an advantage from a ventilating standpoint to have the car windows arranged to open by dropping, instead of by raising; this arrangement to be used in steel cars, or in such other equipment as it would be possible to provide sufficient clearance in the car side for the dropping windows?

The committee does not think that an open window or deck sash, without auxiliary means for directing or exhausting air through the opening, should be used as a part of the ventilating system of a car, except in warm weather when the average day passenger requires the windows and doors and practically everything to be thrown open. In this case the window becomes the entire means of ventilation. The committee does not recommend the dropping window for use in coach or Pullman car equipment.

(5) Should a spring-balanced or counter-balanced win-

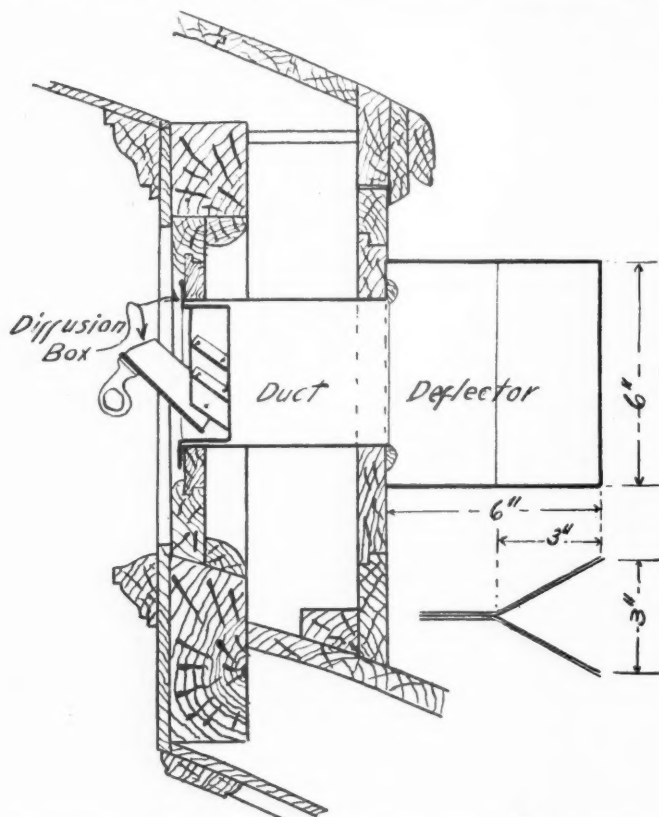
*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of S. G. Thomson, B. P. Flory and T. H. Goodnow.

dow or a regulating ventilator be applied to the lower berth of a sleeping car, in such a way that it could be opened and closed in the summer time by the occupant of the berth, and would this be a practicable method of bettering the ventilation in sleeping cars in warm weather?

The committee recommends that experiments be made with the view of ventilating the lower berth of the sleeping cars, either by means of a balanced window, a ventilating panel, or by a series of ducts and ventilators; such devices to be in addition to the regular heating and ventilating system of the car, and to be used at night when the berths are made up. It further recommends that extended experiments be made with these windows and auxiliary arrangements in combination with the strong exhaust ventilators as now used.

(6) Is it practicable to apply to a sleeping car an indirect system of heating and ventilating, having a series of auxiliary ducts leading to each berth, and registers to be operated by the occupant of the berth?

The committee does not believe that it would be practicable to have a system of ducts with registers leading from the lower heater boxing to the upper berths and recommends that extended experiments be made, with the view to modifying the existing sleeping car equipment, so as to provide open-



Ventilation and Heating of Coaches and Sleeping Cars—
Transverse Section Automatic Ventilator Company's
Ventilator.

ings under each end of the lower berth; These openings to be controlled by the occupants of the berths, and to be used to admit warmed air in cold weather and cool, fresh air in moderate weather. For new equipment, it further recommends a similar arrangement built into the car and applied in a substantial way, with all the requirements and accessories of a thoroughly complete indirect heating and ventilating system.

(7) Is it necessary to have an elaborate ventilating system in our light electric and suburban equipment; or would the ordinary deck sash system be sufficient for these short trip cars which are thrown open for the exit and entrance of passengers at frequent intervals?

For such light equipment as is only occupied by the passenger for a short time, the committee does not believe that an elaborate system of indirect heating is necessary, but that ample ventilation should be furnished by the use of the ordinary deck sash; or, where the conditions are more exacting, by the use of special ventilators applied to the deck in such a way as to admit and to exhaust sufficiently large quantities of fresh air. In such service as does not involve the frequent throwing open of the doors for the exit and entrance of passengers, which is often the case in the winter

on certain suburban railways, the car should have a thoroughly efficient indirect heating and ventilating system, the same as other equipment in long distance service.

(8) How much air should pass through a car in an hour to furnish good ventilation, and is there any better method for determining such amount than by a test for carbonic acid of samples of air taken from different levels in a car under various conditions?

Tests have proved that the average person, such as rides in our cars, gives off six-tenths of a cubic foot of carbonic acid per hour. Sixty persons in a car would therefore exhale 36 cubic feet of carbonic acid, which amount would require 180,000 cubic feet of fresh air per hour to dilute it so that the air in the car would not contain more than six parts of carbonic acid in 10,000 parts of air, the theoretical requirement for good ventilation. This large volume of air equals 3,000 cubic feet of fresh air per person per hour, which amount to your committee seems to be too great to pass through a closed car by any practicable methods. The Pennsylvania experiments proved that 90,000 cubic feet of air, or half the theoretical amount, could be passed through the car by the methods used, but that only 60,000 cubic feet of air could be heated properly in zero weather. It is recommended that a minimum of 1,000 cubic feet of fresh air per person per hour be used as the basis for car ventilation until such a time as another figure can be determined to be a better one.

(9) What is the best method for introducing fresh, warm air into and removing it from a passenger coach and a sleeping car, by the indirect heating system, and at what point should it be admitted and removed?

The committee recommends that the warmed air from an indirect heating system be introduced at or near the floor for all classes of equipment, and be exhausted at the roof at a less rate than it enters; also, for all new equipment, that separate air and heating ducts, with openings between them and to the outside air, be arranged along the length of the car on each side. It also recommends for existing Pullman equipment, that extended tests be made for the purpose of determining the best methods for providing an ample opening for fresh air to enter through a heater box under the berths and for admitting warmed air from heat ducts into the car.

(10) What is the best indirect method for heating the amount of air necessary for the good ventilation of a car, in the limited amount of space available.

No answer is made to this question but the committee says that piping, ducts and openings of an indirect heating system should be proportioned and arranged in constructing new equipment so as to furnish sufficient warmed air for the required ventilation of the car; and that, in cases where a satisfactory temperature can not thus be maintained in severe weather, auxiliary radiators of sufficient size be located inside of the car near the door, or at some other convenient point.

Summary.

In connection with the various recommendations and suggestions presented in detail in connection with the ten questions some general conclusions are as follows:

A.—An indirect heating and ventilating system should be used in all new equipment, the air being introduced preferably at the floor and exhausted near the roof.

B.—Ample openings for fresh air should be provided under the lower berths of sleeping cars.

C.—A slight excess pressure or balance of pressure should be maintained inside of a car when the windows and doors are closed, in order to exclude incoming draughts at the windows and crevices. This can only be accomplished by driving the air into the car a little faster than it is drawn out, and means that the movement of the air must be made to pass through the car, largely by driving it in, rather than by drawing it out by means of strong exhaust ventilators.

D.—An ideal system would be one in which the pressures were balanced and the amount of air passed through the car was entirely independent of the speed of the train. From this it follows that the most efficient exhausting device is not necessarily the desirable one to use if its size must be so reduced to prevent overpowering the inlet when running at speed, that the car is almost bottle-tight when at rest. In other words, an exhaustor which will act efficiently as a chimney as well as an exhaustor, is to be preferred to an exhaustor alone, however efficient the latter may be.

E.—Exhaust ventilators, designed for the purpose of completely controlling the movement of air in a car, should be used only for existing Pullman equipment, until it is possible to change this equipment to embrace the advantages of the indirect system of heating and ventilating. The best results from a ventilator with a strong exhaust is obtained in the sleeping car at night, at which time, on account of the enclosed berths, it may be found necessary to resort to the

strong exhaust method in order to make an indirect heating and ventilating arrangement sufficiently effective.

F.—Sleeping cars in such service as requires the cars to stand at terminals during a considerable portion of the night, should be specially fitted with an auxiliary forced-draught ventilating system, in addition to the regular ventilating system of the car.

G.—Air should be admitted to and exhausted from a car without its being perceptible to the passengers, and it should not pass through the car in decided draughts when the car is closed. The entering currents, therefore, should be admitted so as not to come in direct contact with the passengers.

H.—A minimum of 1,000 cubic feet of fresh air per hour per passenger should be furnished for good ventilation.

I.—Ventilating tests should be accompanied by a test for carbonic acid of air taken from different heights and from different parts of the car.

J.—The thing most desired in the heating and the ventilating of a car, as well as in the keeping of the seats and general interior clean and comfortable, is to shorten the season during which there is a tendency to open the car windows. This season should have a tendency to be shortened as the conditions of heating and ventilation are improved. The later in the spring that there is a desire on the part of the general traveling public to throw open the windows, and the earlier in the fall that there is a tendency to close them, the more comfortable is the closed car, and therefore, the better the conditions of ventilation and cleanliness. This shortening of the open car season, then, may be taken as an indication of development and progress. A clean, comfortable and well ventilated interior will accomplish much in keeping the car closed and in preventing the traveling public from pushing themselves as far outside of the windows as they can. Many travelers always desire to look out of an open window and to sit in the strong draughts, as early and as late in the season as they can; and to do this is most pleasing to all, it is true, when the weather is mild and there is not too much dirt and cinder; but clean and comfortable traveling, as a general proposition throughout the year, can only be accomplished by keeping the windows closed, and it is the closing of the car that makes a ventilating system necessary. The air-handling arrangement then, to perform its function, should maintain a slight pressure inside of a closed car, and always should keep the car full of good, fresh air.

The committee acknowledges its indebtedness to the various railroad officers of the country, who have generously responded to its inquiry for suggestions and information; also to the tests and studies of Dr. Chas. B. Dudley, and to the reports on this subject which have formerly been made to this association, all of which have been a great help in the consideration and presenting of the various problems involved.

SUBJECTS.*

Your committee has received a communication from a prominent railway officer, who in making a reply to our circular letter uses the following language:

"In looking over the subjects assigned to committees by the association, it seems to me that the matters of greatest interest are very well covered by the standing committees, and the subjects assigned to the special committees are entirely too important to endeavor to settle them definitely between conventions. It has been my feeling that for some time too much work has been undertaken by the association to be disposed of in a convention lasting but three days, and that either the number of subjects should be decreased or the time of the convention increased. There has not been, in my opinion, a sufficient amount of discussion on the floor of the convention of some of the reports."

Your committee not only concurs in the suggestions and criticisms embodied in the above quotation, but would strongly urge that the association give serious thought, not only to the number of subjects, but the time allotted for their consideration, and acting on these suggestions in the preparation of our report we offer only three subjects for consideration in 1909, in connection with those which are left over from the 1908 convention:

(1) Standard structural shapes for steel freight and passenger cars.

(2) Standard tests and specifications for car bolsters and definite location of side bearings. The side bearing location to have special reference to the top member or section of truck bolster.

(3) To recommend as a standard a universal interchangeable steam hose coupler. This committee to specify contour,

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of W. E. Symons, William Forsyth and H. Larue.

or outlines, more completely than the present recommended practice, so that these couplers shall be really interchangeable.

For topical discussions your committee, bearing in mind its suggestions with reference to inadequate time to properly handle the present work of the association, offers a limited number of topical discussions.

[The subjects for topical discussion appear in the daily programmes.—Eds.]

Could we not have as topical discussions kindred subjects under one general head? As, for instance, at one session discuss matters pertaining to the construction of cars, or what might be termed manufacturing or shop questions, while at another session subjects pertaining to their operation or interchange. This, with a view of securing a concentration of thought and attendance on the part of the membership at one and the same time, to the end that the subjects under discussion would receive prompt and thorough analysis.

Your committee begs to suggest that with the increased volume of work devolving upon the association, together with the collateral interests in the way of very elaborate and interesting exhibits which require considerable time, the association should take steps toward either lengthening the time at present assigned for the work or eliminating some of the present features, to the end that much of the work which in the past has not received proper consideration may in the future have the attention and treatment which it justly deserves.

TANK CARS.*

The following questions were submitted to letter ballot after the 1907 convention and both failed to receive the necessary two-thirds vote:

"89. Tank car specifications, including provision for stenciling light weight and capacity."

"90. Tank car specifications, excluding provision for stenciling light weight and capacity."

It is quite evident that the two questions as appearing in letter ballot did not cover the views of the members as expressed in the discussion, namely, that light weight and capacity markings were objectionable from a traffic schedule standpoint and that a maximum weight was necessary to enable inspectors to determine the strength of axles and other parts of trucks.

A further canvas of the situation has been made and it is found from a traffic viewpoint that there are no objections to stenciling tank cars "Limit Weight," which will afford inspectors all the necessary information from a safety standpoint, but will have absolutely no bearing on the traffic question of how much is lading and how much is car.

This will involve some change in the requirements for tank cars as submitted last year relating to axles, besides which it is desirable to make slight modifications in some of the other detail requirements to bring them up to date, which are as follows:

Trucks, Size of Axles.—Each truck must have a strength equal to or greater than the strength of the axles used.

Sizes of axles must conform to rule relating to axles in "M. C. B. Rules of Interchange for Freight Cars," which have been modified as below to make them applicable to tank cars:

Axles less than the following prescribed limits:

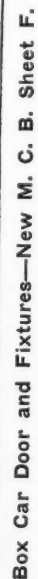
Table I.—For Tank Cars Marked Limit Weight I (Owners responsible.)

Limit Weight I in lbs.	Journal. inches	Wheel Seat. inches	Center. inches
161,000.....5	5	6 1/4	5 5/16
132,000.....4 1/2	"	6 1/4	5
112,000.....4	"	5 1/2	4 3/4
95,000.....3 3/4	"	5	4 3/8
79,000.....3 1/2	"	4 3/4	4 1/8
66,000.....3 1/4	"	4 3/8	3 7/8
58,000.....3	"	4 1/4	3 1/2

Table II.—For Tank Cars Marked Limit Weight II. (Owners responsible.)

Limit Weight II in lbs.	Journal. inches	Wheel Seat. inches	Center. inches
161,000.....5	5	6 1/4	5 5/16
132,000.....4 1/2	"	6 1/4	5
112,000.....4 1/4	"	6	5 1/4
95,000.....3 3/4	"	5 1/2	4 3/4
79,000.....3 1/2	"	5 1/4	4 3/8
66,000.....3 1/4	"	4 3/8	4 1/8
58,000.....3	"	4 3/4	4 1/4

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of A. W. Gibbs, C. M. Bloxham, W. McIntosh, S. K. Dickerson and F. T. Hyndman.



All tank cars to have Limit Weight I, or Limit Weight II stenciled on them.

New steel underframe tank cars built hereafter must have axles to meet requirements of Table II, and cars stenciled "Limit Weight II."

Existing tank cars built prior to this date must have axles to at least meet requirements of Table I, and preferably Table II; and be stenciled "Limit Weight I" if the axles conform to Table I; or "Limit Weight II" if the axles conform to Table II. When all the axles under any car are changed to meet the requirements of Table II, the stenciling must be changed from "Limit Weight I" to "Limit Weight II" to protect the tank car owner when renewals of wheels or axles are made in repairs.

Safety Appliances.—Change to read: "Each end of car must be provided with the necessary steps, grabirons, etc., to comply with the requirements of the M. C. B. association. Each tank car must be provided with substantial and adequate hand railing securely fastened and applied as shown in the standards of the M. C. B. Association. Where, from the construction of a car, a side hand railing is inadmissible, and therefore, involves an overhead running board and high brake staff, each end of car must be provided with ladders to comply with the requirements of the M. C. B. Association."

This change is suggested to more clearly specify the use of the M. C. B. standards.

Dome Yokes, Tank Straps, Etc.—Change to read: "Tanks must be secured from turning on the underframes, either by center anchors riveted to the tank and underframes, or by means of dome yokes, and must also be secured to underframe by means of tank straps, two for tanks not more than 76 inches in diameter, and four for tanks of greater diameter. The center anchors may be made of two parts, sliding into each other, one riveted to the tank and one to the underframe. The sectional area of dome yokes and tank bands must at no place be less than three-quarters of a square inch, or one inch round iron upset to 1½ inches at threaded end. Cars having no underframe, with tank securely riveted to body bolsters, do not require dome yokes or tank bands."

The following has been added to this paragraph: "The center anchors may be made of two parts sliding into each other, one riveted to the tank and one to the underframe. This method of securing tank to underframe when properly designed is efficient and, therefore, should be allowed."

Vent Hole or Small Valve.—Change to read: "Tank cars carrying non-inflammable or non-volatile material, such as sulphuric acid, vinegar, linseed oil, cotton seed oil, lard oil, fish oil, tannery products, glucose, molasses, calcium chloride, caustic soda, silicate of soda, etc., need not be provided with 5-inch safety valves, but each tank should have a small open vent or valve equal to not less than two inches in diameter."

The size of opening for small open vent or valve has been specified to be equal to not less than two inches in diameter. The question as to the size of this opening has repeatedly been raised by tank car owners and builders and, therefore, a recommended size is given, which is considered necessary to relieve the tank of pressures developing in case a loaded tank car carrying commodities enumerated under this heading is surrounded by fire. It is entirely a safety requirement, and in the absence of any specific tests on record to determine the exact size, it is felt that at least a 2-inch opening should be provided. Your committee, however, is following up this question to obtain some reliable data in regard to the exact size of opening necessary.

Center Sills.—Change to read: "If cars are not equipped with intermediate sills, the underframes must have two center sills, each not less than five inches wide by 10 inches deep, or the equivalent in strength. If the car is equipped with intermediate sills, the center sills must not be less than five inches wide by nine inches deep, or the equivalent in strength. Center sills must not be spaced more than 18 inches apart."

This paragraph has been rearranged to make the reading more clear, no change having been made in the requirement.

Draft Timbers.—Change to read: "Draft timbers secured to inside of center sills and extending to cross-bearer or cross-timber will be accepted as a substitute for filling timbers referred to above. Where center sills are nine inches wide by 10 inches deep or over, and draft timbers are placed between same, they need not extend farther back than body bolster, provided they are adequately secured to center sills by means of seven ¾-inch bolts, or their equivalent, and butt against body bolster. Draft timbers located underneath the center sills must not be less than four inches wide by eight inches deep, and each draft timber must be held to center sills, end sills and buffer block by means of seven or more ¾-inch bolts, or six 1-inch bolts. Where an arrangement for supporting draft timbers is substituted for one or more bolts and the construction is of equal strength, the same

will be acceptable. Draft timbers extending beyond bolster must be secured to center sills by additional bolts."

No change in requirements in this paragraph has been made but a rearrangement of the wording to assist the inspector in correctly interpreting same.

Longitudinal Anchorage of New Tank Cars.—In tank car report to the 1907 convention your committee called particular attention to the necessity of some improved method of preventing end movements of tanks, and wishes to emphasize that the present method of fastening tank between head-blocks is unsatisfactory, and in the tanks of larger capacity is causing serious damage to the steel underframes in driving down the ends. New tank cars built hereafter should be securely anchored to the underframe either at the center or at one end, which will prevent the shifting of the tank on the underframe and thus avoid the constant hammering of the tank against the head blocks and will also allow for the necessary expansion when the tank is steamed. Your committee is not prepared to incorporate this in the requirements, but all new tank cars built in the future should be anchored in this manner.

The committee would recommend that there be submitted to letter ballot for adoption as "Recommended Practice" the following:

1. Tank car specifications, with the exception of axle requirements, presented last year (The Daily Railway Age, June 20, 1907, page 1161) with the modifications suggested in this report, it being understood that the axle requirements and stenciling "Limit Weight" will be voted upon separately.
2. Axle requirements with the provision that the tank cars be stenciled "Limit Weight."

BOX CAR DOORS AND FIXTURES.*

The committee has made a new drawing for M. C. B. Sheet F, which shows a side door, door stops, bottom guides, chafing strips, wedges, hasp, hasp holder and handle; also, the location of the door stops, guides and chafing strip.

The door has been designed for an opening six feet wide, and of a height suitable for a car of the inside dimensions approved by the American Railway Association and the "Recommended Practice" of the M. C. B. association. The sheathing of the door should not be driven tight, in order to prevent warping as much as possible.

The closed door stop should be of wood 3¼ inches wide, secured by six ½-inch bolts. The bolts should be staggered to prevent splitting the wood. There should also be at least two metal closed door stops, each secured with two ½-inch bolts with furring under the sheathing.

The door stops for the open door position should be at least two in number and provided with lips. Each stop should be secured with not less than two ½-inch bolts, with furring under the sheathing, unless posts or girths are available.

There should be two 1-inch half-oval chafing strips to protect the sheathing back of the door when open. One strip located near the bottom and the other at about one-half the height of the door.

There should be at least four bottom guides, located so that not less than two guides will engage the door in any position. Each guide should be secured to the sill of the car by at least two ½-inch bolts. The bolts for the guide at rear corner of door in closed position should have the nuts riveted over or bolts locked in other suitable manner.

The door hasp staple should be secured with two ¾-inch carriage bolts, with the nuts inside and a washer under the nuts. The frame should be counterbored for the thickness of the nuts. The door hasp fastener should be secured with not less than two ¾-inch bolts, with the nuts inside, and it is recommended that the fastener have a flange that will lip over the back of the wooden door stop. The door hasp fastener is a specialty which is usually purchased from manufacturers, therefore no drawing has been made.

The use of door hangers of patented designs has become almost universal, therefore it does not seem desirable to attempt to show a design for a door hanger. Each door hanger should be secured with not less than three bolts at least ¾-inch diameter with nuts outside.

The track for the door hangers should be of some standard structural steel shape at least 3-16 inch thick, which is readily procurable on the market. The track should serve the double purpose of a runway for the hangers and a weather proof and spark proof door hood. The track should also be arranged so that the door can not drop off if the hangers are broken.

End doors are not generally used on box cars, therefore, the end door and fixtures for it have been omitted.

*A report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of C. S. Morse, J. A. McRae, O. M. Stimson, J. P. Young and W. Percy.

PROTECTIVE COATINGS FOR STEEL CARS; THE METHOD OF APPLICATION AND THE RESULTS OF EXPERIMENTS MADE.*

During the past year your committee has worked diligently to ascertain the most satisfactory method in connection with this subject, but has found the field of research so great that it is not possible for us to cover it in one year. We feel free in saying that even two years is hardly sufficient time to make an intelligent report, for the reason that the most capable have been giving this subject much consideration for years past, and yet have not presented anything very definite, and time only will prove the durability of the different mixtures which are used.

Your committee at this time has some few cars under test and it might be of interest to learn the progress we have made, as follows:

- One car covered with a coating of crude petroleum oil;
- One car painted with special black paint and covered with a coating of good fish oil;
- One car painted with special black paint and covered with a coating of locomotive cylinder oil;
- One car painted with common paint and covered with equal parts of raw linseed oil and pure glycerin;
- One car painted with common paint and covered with Cleanola;
- One car painted with common paint and covered with well-rubbed-in commercial tallow;
- All of these cars were sprayed on the inside with crude petroleum oil.

The following are our recommendations as far as we have gone:

We are of the opinion that suitable buildings should be provided for the painting of cars, so that the painting of the equipment would not necessarily be confined to certain seasons of the year, for it is essential that your equipment, regardless of the season, be well covered with a protective coating in order to arrest deterioration, which otherwise is very rapid.

In the preparation of the assembled parts of new cars, they should not be exposed to the weather or permitted to rust before their assemblage. In all cases where metal is placed against metal, either riveted or bolted, it should be free from flash or rust and covered with one or two coats of red lead, and the mixture be heavy enough to exclude moisture. But this precaution will avail little unless extra care is taken that all the steel parts fit evenly and are applied in like manner.

After cars are ready for the first coating, it is necessary that all flash and rust be removed. This should be done under rigid inspection. Unless the flash is removed it will invariably fall off inside of one year and continue as long as any remains, regardless of the number of coats of paint applied. We recommend that all flash and rust be removed by sand blast, where possible. Would next recommend dry cleaning (which we do not believe so satisfactory) by using steel scratch brushes, sandstone, or any tools which will answer the purpose; being particular to remove all the dust with suitable brushes or dusters. After following either of these cleanings, we suggest the application of three coats of paint at 24-hour intervals.

In the preparation of cars for repainting, we again recommend cleaning by sand blast, but if this cannot be done owing to conditions, then use the dry-cleaning process, as previously mentioned. After the dry cleaning, we would recommend two coats of your standard paint applied at 24-hour intervals.

After we have taken all these precautions to protect the outside of the car, we find that with experiments made in the past, under ordinary conditions it is necessary to repaint at the expiration of three years, and where conditions are unfavorable to the equipment it will be necessary to repaint oftener.

We cannot be too emphatic as to the necessity of taking the proper care of the exterior, and regret that we are not able to give the interior the same care.

The best of paint should be used in order to prevent rust after painting, and by using paint which has the greatest wearing elasticity, the less liability there is for the penetration of moisture.

Adhesion is just as important, and to have perfect adhesion, the paint should dry from the inside out, the same as good varnish.

Elasticity must also be considered, for where adhesion is perfect and no elasticity in the materials, we cannot hope for good results. For the reason that expansion and contraction

of the plates must be provided for, the use of linseed oil or its equivalent, "Derider-headed," is preferred.

The painting of the inside of steel cars has been thought by some to be beneficial, but your committee can see no lasting benefits in this, and do not recommend it, but is of the opinion that coating the interior of the cars about once every six months with black oil would act as a preservative.

Further than this we are not able to offer any recommendations, and would, therefore, respectfully ask that your committee be continued for another year in order to determine the results of the tests which we are now making.

STANDARDS FOR THE PROTECTION OF TRAINMEN.*

This subject has not had the direct oversight of a standing committee, which is deemed desirable and is here recommended.

The committee has not lost sight of the broad principles of the protection afforded by the standards and has endeavored to apply them consistently to all types of cars in use. No radical changes in the text will be found.

Sheet M. C. B.—19 has been preserved with very little change, and it is followed by detail sheets, one for each car arrangement shown on sheet M. C. B.—19, each with voluminous notes taken from the text, so that ordinarily the text need not be referred to in seeking information.

Each car arrangement has been given a different letter designation as follows:

- Box and other house cars with end ladders. A and B
- Box and other house cars with side ladders. C and D
- Drop-end gondolas E and F
- Fixed-end gondolas, low side. G and H
- Fixed-end gondolas, high side. I and J
- Tank cars K, L and M
- Flat cars N and O
- Hopper cars P

The detail sheets are numbered 19-A, 19-B, etc., each showing the car arrangement indicated by the letter.

The use of the word "grabiron," as used heretofore in the Standards, is considered unnecessary, and it has been omitted in the revision of the text and the drawings, retaining the word "handhold" as inclusive and fully describing the device.

Another point which has been changed is to more clearly define the length of handholds. In general practice this length is the distance from center to center of holes, but owing to the variety of methods of turning and shaping the ends this length does not indicate the clear length available for the hands. The revision proposed states the clear length, and in most cases the minimum length to be used.

It is conceded that absolute measurements are not desirable and that reasonable variations are necessary, but the committee is of the opinion that the intent and purpose of the standards can best be carried out by the establishment of a minimum dimension which will permit increase rather than an indefinite range either side of a nominal dimension. After examination of a large number of cars, including the later modern types as well as the older ones, it was decided that a proper minimum length that would serve all purposes as to safety, utility, and convenience, as well as the necessities, when used both as a handhold and foothold, is 16 inches clear length. When used only as a handhold and not as a foothold, a shorter length is permissible, and for such handholds we deem 12 inches a safe and convenient minimum length.

These dimensions have, therefore, been generally used in the proposed revision, it being understood, however, not to discourage the use of, or to change on present equipment, any handholds exceeding 16 inches clear length.

No maximum length of handholds is given, this being deemed unnecessary, but it is the thought of the committee that handholds that are used as ladders which must exceed a length of 24 inches should be increased in diameter.

Examinations of cars also disclosed the fact that on many low side gondolas, both drop and fixed ends, and some hopper cars, there is not sufficient total depth of sill and side to apply a vertical handhold of 16 inches clear length, and the stakes for the proper attachment of sides of these cars and also on flat cars to retain lading make it equally difficult to apply a full-length horizontal handhold. In most cases the vertical arrangement is preferable but impossible, account of limited depth available. In order not to enforce a condition impossible to fulfill and obtain the maximum length of handhold which can be applied over the steps on these cars, it was decided to require as much clear length as the car construction would permit, believing that this will give the necessary latitude to meet existing conditions, yet provide satisfactory

*A report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of G. E. Carson, T. Rumney and S. A. Cromwell.

*Abstract of a report presented at the annual convention of the Master Car Builders' Association at Atlantic City, N. J., June, 1908, by a committee consisting of C. A. Seley, R. F. McKenna, T. H. Curtis, A. LaMar, B. Julien, E. Posson, W. K. Carr and C. B. Young.

handholds. Another reason for conceding the necessity for these handholds to be shorter than the standards required for other handholds is the fact that they are not used for foot-holds.

We have also modified the requirements governing the height of side and end handholds. The general requirement for height on all cars except flat cars was to have side handholds not less than 18 inches nor more than 30 inches above the center line of coupler. End handholds, unless on flat cars, drop-end gondolas, etc., were also covered by the same dimensions. This range of height of side handholds has been retained on cars having a considerable height of superstructure, but the upper limit only has been retained on low side gondolas, hoppers, etc. It was found impossible to comply with the 18-inch minimum height on many low-side cars of various types, and it has, therefore, been omitted.

It has been omitted entirely with reference to the height of end handholds on all cars. The purposes for which these are now used are better served by the lower locations, and we have named the under side and face of the end sills as the preferred locations, the coupler unlocking rod being also available as an end handhold.

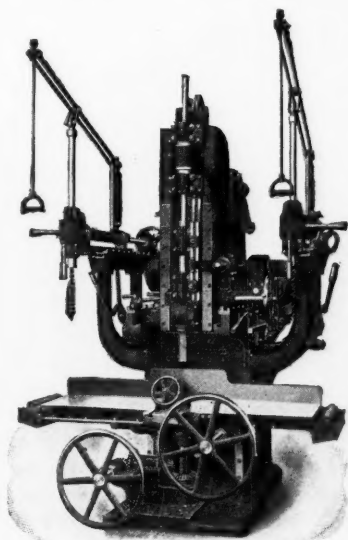
Caboose cars have been added as coming under freight train car requirements. Passenger train cars have been separately covered and will be found directly following the freight standards.

The Master Car Builders' Dictionary has been used as the authority for defining the use and the proper names of appliances used in connection with these standards.

The report then takes up in detail the present standards and proposed standards.

CAR MORTISER FOR HEAVY WORK.

The accompanying illustration represents the latest car mortiser built by the J. A. Fay & Egan Company, Nos. 155-175 W. Front street, Cincinnati, O. It is designed for heavy work in both car and bridge construction, and is made with one, two or no auxiliary boring attachments. It



Car Mortiser for Heavy Work

has a capacity for mortises from one-half to three inches square, and up to six inches deep; or, by reversing timbers to 12 inches deep. The frame is a single-cored casting with wide heavy base. The housing is securely gibbed to the frame with provision for taking up wear, and moves transversely on frictionless rollers by means of a hand wheel and can be securely locked in any position desired. The chisel ram is gibbed to the housing, and has a vertical travel of 18 inches. The auger spindle is driven at the proper speed by a belt with take-up so that the strain is constant regardless of the position of the housing. The reciprocating motion of the chisel ram is produced by a pinion in a rack operated by friction pulleys, giving a constant and positive drive. The table is made either stationary or traveling. The stationary table is 6 feet 6½ inches long and is provided with stops to regulate the length of mortise. It is operated by hand wheel, rack and pinion and can be raised and lowered by hand. The traveling table, which can be furnished any length desired, is made of steel I-beams and has an automatic feed under instant control by the operator and is provided with adjustable stops for regulating the distance between mortises. The countershaft is self-contained in the base of the machine, convenient for direct connection of motor drive. It has tight and loose pulleys 18 inches in diameter by 8½ inches face, and should make 840 revolutions per minute. The auxiliary boring

attachments swing 30 degrees in either direction. The two spindles have a vertical stroke of 18 inches and a lateral adjustment of 18 inches, and are driven by independent countershafts, having tight and loose pulleys 10 inches in diameter by 4½ inches face, and should make 750 revolutions per minute.

AIR BRAKE INSPECTOR'S TEST GAGE.

The accompanying illustration shows a handy and compact form of test gage in combination with a hose coupling bracket for ready attachment to air brake or signal line couplings. By the use of this gage,



Ashton Air Brake Inspector's Test Gage.

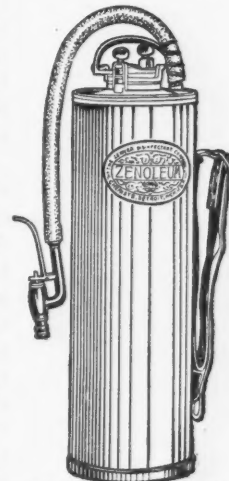
which is manufactured by the Ashton Valve Company, air brake inspectors are enabled to make their tests at frequent intervals, by connecting the gage direct to the hose couplings at the rear of the train. The gage has a dial two and one-half inches in diameter and full nickel-plated case. The top and bottom thumb-screw adjustments make possible a perfectly tight connection, and the side valve serves as a

drain cock to allow the escape of air pressure between the hose cock and the gage when the cock is shut off after making a test.

ZENOLEUM COMP-AIR SPRAYER.

Something new and especially adapted for railroad work is the Zenoleum Comp-Air sprayer made by the Zenner Disinfectant Company of Detroit, Mich. This machine holds about four gallons of liquid and is supplied with a hand compression shut-off nozzle, designed especially for use where the spray is to be cut off quickly, and to avoid the uncertainty of using the old-fashioned thumb-screw on the nozzle.

The Zenoleum Comp-Air sprayer is durable, being made of the best materials by trained mechanics and each machine is tested under high pressure and is guaranteed against bursting. The device is two feet high over all, has a diameter of seven inches, and when empty weighs about seven pounds; when loaded it weighs about forty pounds. For spraying about cars and shops and toilet rooms in the shop and in stations the Zenoleum Comp-Air sprayer serves the purpose. It is designed to meet a sanitary requirement which is frequently neglected, but which should be attended to by every road.



Zenoleum Comp-Air Sprayer.

The Moran Flexible Steam Joint Company of Louisville, Ky., has no exhibit for the first time in about 15 years, but it is adequately represented by C. H. Jenkins. He is distributing watch fobs of neat design.

With Exhibitors and Others

With each succeeding convention the Hale & Kilburn Manufacturing Company surpasses its former efforts as is clearly evidenced by its large and elegant exhibit of the present year. A specially attractive feature is formed by a dozen or more Walkover car seats in brilliant-colored coverings, but the feature of particular interest from a practical point of view is found in its new pressed steel products in the line of fire-proof all-steel doors, metal sash and steel car seats. By a process controlled by the company, sections of steel, as door and sash frames, are so completely fused together and welded that after grinding it is impossible to see the line of union and it is stated that tests indicate as close a union as exists in any part of the material where no joining has taken place. A number of articles showing the results of this process of welding are contained in the exhibit, being exemplified in three sizes of doors built for 175 new steel coaches for the Pennsylvania Railroad. There are also shown samples of new steel Walkover seats for the same order of coaches.

The Champion Rivet Company is showing samples of a special design of steel rivet, made cold in solid dies for use in steel passenger car work. W. H. S. Bateman, sales agent, will be glad to meet you at booth 390.

George E. Pratt, vice-president and general manager of Central Inspection Bureau of New York, has appointed as expert locomotive inspector C. A. Swan, Jr. He will look after the construction of 30 locomotives for the Argentine which are to be built at the Schenectady plant of the American Locomotive Company. Mr. Swan was for many years president of the International Railway General Foremen's Association. He has been connected for many years with the mechanical departments of railroads and is thoroughly conversant with locomotive construction, operation and maintenance. Mr. Swan is well known throughout the country among the railroad fraternity and Central Inspection Bureau is to be congratulated on securing his services.

In booth 456-459, the Pantasote Company, New York, has a most interesting and convincing evidence of the water proof qualities of "Agosote" headlining. The exhibit is comprehensive, showing a large section of headlining being flooded with water. The water has been running ever since the opening of the convention and will continue in this condition until the last day, when the headlining will be sawed into small pieces to show what effect the water may have had. All interested are requested to be present for this demonstration.

The Duntley vacuum cleaner is being shown in the booth of the Chicago Pneumatic Tool Company. This is the newest projection of John W. Duntley in the application of compressed air. These machines are made in sizes from 50 pounds up. This is not only the plain vacuum cleaning, but it has a shampooing attachment by which a car seat may be washed. The Chicago Milwaukee & St. Paul is using these machines and advertising the fact as one reason why the public should use that line.

Every passenger coach on exhibition at this convention is equipped with the O. M. Edwards Company devices. The Strang gas electric car Irene as well as the Pennsylvania steel coaches are fitted with the 7 B. F. No. 1 design of window fixture, and Edwards trap doors are also on the coaches. This company is showing in its booth a full size double sash dinner or parlor car window on spring balance,

the weight of the window being 90 pounds. With the invention of the steel coach steel vestibule trap doors and sash and doors have been designed. The O. M. Edwards Company has kept pace with all the demands of these requirements and is showing all the latest models.

The Gisholt Machine Company is exhibiting one of its 24-inch "big bore" lathes finishing cross head pins off the bar and is creating considerable interest. A little booklet this company is distributing shows the Gisholt methods for finishing various parts such as piston centers, cross heads, eccentrics, etc. A novel feature of this booklet is a head-on view of a locomotive used as a cover design. Other machines exhibited by this company are its 52-inch vertical boring mill and the universal tool grinding machine.

The Northern Metallic Packing Company of St. Paul, Minn., manufacturers of standard metallic rod packings and the Curran chime whistle, is represented by its sales manager, A. Munch.

Shop time keeping and cost estimation are constant sources of anxiety to all having the supervision of large plants like railroad shops where many men are employed. The Calculagraph, an instrument to insure absolute accuracy of cost-keeping at the start of manufacturing by mechanically subtracting and recording the elapsed time of the workmen, is on exhibition on the pier. The results obtained by this machine give an absolutely correct basis of computation. The telephone toll messages of the entire world are said to be timed by it, and its use means in many cases dividends instead of failure.

Whiting Foundry Equipment Company, space 113, shows a moving exhibit of the hoisting mechanism used on its electric cranes, featuring the double automatic safety brakes (solenoid and load), which give absolute control of the load during all movements. Dropping of the load is impossible. These brakes have been adopted by the steel interests for use on roller tables and pull ups, also on ore handling machinery and whenever it is necessary to have sensitive control of the electrically operated machinery.

Chas. H. Besley & Co., Chicago, exhibit a very interesting and instructive case of machine and hand tap in booth 160.

At the exhibition in connection with the International Railway Congress held in Washington two years ago, the Draper Manufacturing Company of Port Huron, Mich., made a record of welding and swedging 104 2-inch flues in 60 minutes with its pneumatic flue welder. This was a record performance, but in actual practice many railroads are welding and swedging regularly 600 or more 2-inch flues per day of nine or ten hours. At the shops of the Philadelphia & Reading at Reading, Pa., the regular average, day after day, is slightly over 600 tubes.

In space No. 401 is the exhibit of the Pilliod Company, of Swanton, Ohio, and Chicago. The Baker-Pilliod locomotive valve gear is being shown. C. J. Pilliod and H. J. Pilliod will be pleased to explain the device.

Carter Iron Company, Pittsburg, calls attention to the fact that the company is made up of specialists in high-grade iron and that all connected with the organization are drilled to work exclusively in high-grade iron with the result that the product competes successfully with the famous old English iron. The company manufactures a variety of high-grade material for the United States navy department and for many railroads, one of its products being chain from iron manufactured in its own works. The representatives

of the company at the convention are W. J. Johnson, general manager; C. Murphy and Robert Spencer, representatives at Chicago and New York respectively.

* * *

The American Tool Works of Cincinnati has been unable to exhibit this year owing to unavoidable delays, but Robert S. Alter, secretary of the company, is here and has a full line of literature describing the various types of machines for railroad shops built by the company, including lathes, round-house lathes, planers, shapers and radial drills. These are all of the high-power heavy-duty type, as shown by the following examples: Twenty-inch patented geared head lathe removes $7\frac{1}{2}$ pounds of cast iron in one minute; the new heavy pattern quadruple-geared planers handle the heaviest and most severe class of work; the 4-foot triple geared high-speed radial drill pulls a 6-inch pipe tap through $2\frac{1}{2}$ inches of cast iron in one minute and drills a 1 15-32-inch hole through $14\frac{1}{2}$ inches of cast iron in one minute; and larger sizes in proportion. The new 2-foot heavy duty radial drill will pull easily a $2\frac{1}{2}$ -inch pipe tap and has a wide range of spindle speeds to handle drills of extreme sizes. Examples of saving by use of these machines are shown in the following table:

Lathe work, cone pulley roughed and finished, old time, 2 hours, 40 minutes; new time, 38 minutes; planing, lathe bed, old time, 17 hours; new time, 9 hours; radial drilling, column of machine, drilling and tapping, old time, 12 hours; new time, $3\frac{1}{2}$ hours; 28-inch shaper takes roughing cut in cast iron $\frac{1}{2}$ inch deep by 5-32-inch feed; in steel $\frac{1}{2}$ inch deep by 5-64-inch feed; and other operations in similar ratio.

* * *

The claims for Gold's improved temperature regulator for passenger cars include the following: A mild and pleasant heat; uniform temperature in every car; lower pressure on train line; hose will last much longer; drain on locomotive very materially reduced; quicker heating of trains; plenty of steam for rear cars; less wear on all parts of apparatus; better ventilation.

* * *

The "circulation department" of "Storrs' Calendar of Railroad Club and Association Meetings and Conventions" may be reached by leaving word at the exhibit of Storrs Mica Company, space number 53, Entrance hall. Any complaints of non-receipt of these calendars or receipt of too many copies of same, will be cheerfully adjusted.

* * *

Anti-Pluvius keeps the rain and dust out and reduces the breakage of glass from vibration and expansion or contraction, and is a big advance in skylight construction for railroad shop buildings. This is the claim of the G. Drouve Company for the Anti-Pluvius puttyless skylight system. A number of installations of this skylight has been made, notably that of the new Lackawanna terminal at Hoboken. The company's headquarters are at Bridgeport, Conn., and its exhibit is at space No. 471, near the Greek Temple—where the meetings are held.

* * *

The Farlow Draft Gear Company has issued a handsomely bound and attractive catalogue showing engravings of their latest designs of draft gears. This catalogue shows phantom illustrations of designs which have been in use from three to five years on different railroads throughout the United States and no doubt it will be interesting to mechanical railway men. The strength, durability and simplicity has gained for the Farlow a national reputation. A copy of this catalogue can be obtained by writing either their Baltimore or Chicago offices.

* * *

The Farlow Draft Gear Company has on exhibition at spaces 428 to 432 a draft gear as applied to engine tenders. This design is particularly interesting from the fact that it has withstood all the severe buffing shocks in service and shows no signs of defects. This draft gear is claimed to be

especially valuable for application to tenders because of its absolute exemption from yoke troubles where the rivets shear or the yoke gives out. Considering the daily service value of an engine, a draft gear exempt from troubles will quickly justify its use. This draft gear is used rather extensively on some railroads on engines, one road having 143 of its latest engines equipped and another has 100.

* * *

The all steel brake beam manufactured and exhibited by the Buffalo Brake Beam Company, is receiving much attention and favorable comment. It claims the distinction of being the only brake beam in which not an ounce of casting is used, the heads, fulcrum and chain clips being of forged steel; the section of rolled steel.

* * *

The users of hoisting apparatus have an exceptional opportunity to study the internal mechanism of the Triplex block, at the Yale & Towne exhibit. Among other hoists, a 1-ton Triplex block is shown, so constructed that it may be entirely dismantled and put together piece by piece, enabling a detailed study of each part and its relation to the other parts of the machine. Two Triplex blocks of the same type are also shown, operating by electric motors.

* * *



OPEN.

This is not a puzzle. It is the Keystone connecting link, used by railroads for repairing, attaching, lengthening and shortening chains. These links are on exhibition at the booth of the Keystone Drop Forge Works, space No. 379 in the Amusement room on the pier.

The demand during the past two years for high speed drills has necessitated the speeding up of the portable air drills, and in order to meet the requirements of the trade, the Chicago Pneumatic Tool Company is exhibiting a No. 2 standard "Little Giant" high speed air drill fitted with a combination chuck for taking drills, either Morse taper or flat high speed steel. The combination is unique and ought to prove interesting to shop people generally.

* * *

"Who represents whom?" is a question which at convention time is pretty accurately determined by the agile and seemingly tireless members of the enrollment committee; but for the rest of the year the Pocket List of Railroad Officials appears to fill the bill in a most satisfactory manner.

* * *

The Creco roller side bearing has been a recognized success for about ten years, and in view of the report upon "Side Bearings" as made by a committee of the Master Car Builders' Association this year, the manufacturers consider that their display of these bearings will be of especial interest.

* * *

The Otley Manufacturing Company, Chicago, state that Eureka graphite pipe cement, for pipe joints, is made of pure graphites and oil; also that it has a bulk nearly four times greater than red lead, making it more economical even at higher cost. It readily yields to the pipe tongs years after application and is ready for use at all times if the package is kept covered.

* * *

The New York New Haven & Hartford has installed, or is installing, Mason safety tread, carborundum-filled, in its new stations, including large amounts at Morris Park, Van Nest, Baychester, Bartow, West Farms, Westchester, Woodside, Eastchester, Port Morris, and Waterbury. Recently the company has used between 2,500 and 3,000 square feet.

* * *

Since the 1908 meetings of the mechanical associations convened many of the visitors have been surprised on an inspection of the exhibit of the National Tube Company to learn that there are over 30 places on a locomotive where

the Shelby seamless tube can be used to advantage. The National Tube Company recently published a list of over 200 uses for Shelby seamless steel tubing, indicating the extremely broad field in which it is applicable. Of perhaps the greatest interest to railroad mechanical men is the way in which the Shelby tube can be substituted for solid stock, bored or forged. One of the strong claims made by the manufacturer for the Shelby tubing is its great reliability since the process of manufacture requires that only the very best material be used, inferior material not being able to withstand the strain.

A complete line of Columbia Lock Nuts may be seen at the booth of the U. S. Metal and Manufacturing Company, which is the railroad agent for this device. The company reports that the nut is becoming more popular every day with the railroad officials.

Ward of the Ward Equipment Company, which makes its initial bow at this convention with all kinds of apparatus for car heating, is the same John E. Ward who has been here more years than some of us can remember.

The Pressed Steel Car Company of McKees Rocks, Pa., has recently installed Mason Karbolith car flooring in 60 steel cars for the Pennsylvania Railroad, and in 10 cars for the Hudson Companies; also Mason carborundum safety treads on the new passenger coaches of the Pennsylvania Company.

The Niagara car mover, a convenient and easily handled tool for moving cars, is represented at the convention by the Maryland Railway & Electric Supply Company, of Baltimore, which is the exclusive southern sales agent. The Niagara car mover weighs but 15 pounds. Another specialty handled by this company is the Spencer turbine vacuum cleaner. This operates on a new principle using a direct connected motor and can be installed economically in railroad yards for cleaning coaches or used in offices to advantage.

The evolution of baggage racks in passenger cars is interesting to reflect upon. In America the rack has frequently been more like a wire basket and originally shared the space along the sides of the car with the lamps. In Europe it is not unusual to see in cars built on the American model with a center aisle, a double deck rack extending from the side of the car to the aisle, built solid to the backs of the seats which face each other. The modern rack, like the McCarthy, made by the Rostand Manufacturing Company of Milford, Conn., could almost be described as an ornament if it were not a necessity. It has the appearance of lightness, and yet it has the required strength.

Among the many new devices being exhibited by the Chicago Pneumatic Tool Company, spaces 153-155 and 157, is a No. 80 Boyer riveting hammer equipped with M-S. tool holder, for preventing rivet set, chisel, backing out punch or other tools from being shot out by the piston, in case the hammer is operated when not in contact with the work. This is a feature of great advantage to boiler, structural iron and bridge workers, especially when employed in executing riveting in elevated positions. The tool holder in question makes possible the use of the riveting hammer for purposes heretofore impracticable, such as cutting off rivets and backing them out. Recent tests have demonstrated that by the aid of this attachment, $\frac{3}{4}$ and $\frac{7}{8}$ -inch rivets can be cut off and backed out in about 35 seconds on the average.

If the following companies have determined that the Brown metallic window strip is best to use, it must be so. Here's the list: Pullman Company, New York Central, Pennsylvania, Union Pacific, Chicago & Alton, Lehigh Valley, New York New Haven & Hartford, Southern Pacific, Florida East Coast, Erie, Philadelphia & Reading, West Shore. This device is made by the Metal Plated Car & Lumber Company.

The Nathan Manufacturing Company, New York, has a very well arranged exhibit, including injectors, lubricators, the Klinger reflex water gage and other general boiler appliances. The Klinger reflex water gage embodies a very unique way of distinguishing the water height line. The corrugations at the back of the tube reflect a black light through water and a white light through the steam filled portion of the tube.

The Commonwealth Steel Company, St. Louis, exhibits some small models of its transom draft gear for both wooden and steel cars. By the transmission of all pulls and buffing blows, direct to the body bolster, and in turn to the sills, it is claimed that all strains are distributed evenly throughout the car and the total cost of repairs of a car fitted with this gear is materially decreased.

Superintendents of motive power and master mechanics will be interested in the graphic description of a Holmen coaling station for locomotives as shown by Roberts & Schaefer Company, space 565 Marine Hall. The company displays a reinforced concrete station built for the Chicago & Alton, the picture clearly showing the operation of the plant. Mr. Barrett, Vice-president and Chief Engineer, has an elaborate bulletin on locomotive coaling stations that he is presenting to those interested.

The Griffith folding trap, of which C. E. Griffith is owner and Brewer Bros., Philadelphia, Pa. the builders, is exhibited in two forms, steel and wood. This appliance is a positive safety device, as it is impossible to close the trap except by also closing the vestibule door. This trap is now in use on several roads. C. E. Griffith, A. Brewer, R. Brewer and M. C. Brewer are in attendance.

The exhibit of the Standard Steel Company, Pittsburg, Pa., in booth 103 contains an all steel truck, developed along lines of electric traction work suitable for use under passenger cars of railroads having electric zones. A special feature of the truck is the equalizer bar and brake beam arrangement, which allows a positive and close adjustment of the brakes on the wheels. Another feature is the extra heavy pin in the spring link hanger. The truck weighs about 12,000 pounds.

The Maryland Railway & Electric Supply Company, of Baltimore, is the exclusive southern sales agent for Monarch metal polishes. It is claimed for these that they contain neither acid nor grit, will not settle in bottom of can and require minimum amount of work. The Monarch polishes are also furnished in paste and powder form for furniture cleaning and leather renovating.

Castle Nuts.

The use of castle or castellated nuts is becoming quite general for the reason that they are evidently the only logical design yet devised for a positive, safe and mechanically perfect lock nut. Their use first became general among automobile manufacturers who found that under all conditions of extreme vibration and hard usage the slotted or castellated nut best met the situation. The attention of motive power department officials having been called to these nuts they are now being used in increasing quantities for locomotive work. The Russell Burdsall & Ward Bolt & Nut Company of Port Chester, N. Y., is exhibiting a full line of castellated nuts which are believed to be far more satisfactory for locomotive work, where a positive lock nut is desired than any device that can be used. The company reports that trade on its castle nuts is increasing faster than on any line of goods which it makes.

THE INGOLDSBY 60-TON STEEL DUMP CAR.

The steel coal and ore cars now generally used in American railway practice have a nominal capacity of 50 tons. The Ingoldsby car here illustrated has a capacity of 60 tons and is specially adapted to the ore traffic. The cars in the train illustrated had an average loading of $62\frac{1}{2}$ tons and

plished by the steep incline of the bottom sheets at the ends and the wide drop bottom doors at the sides. These are held in place by hooked levers, which are distinctly seen in the illustration, and all hooked levers on one side are actuated by a single handle for release. These cars were built by the American Car & Foundry Company, at its Detroit shops,



The Ingoldsby 60-Ton Steel Dump Car—Train of Cars with Average Load of $62\frac{1}{2}$ Tons of Ore Each. 

they have repeatedly carried $83\frac{1}{2}$ net tons,—167,000 pounds. A test load of 285,000 pounds was placed on one of the cars without causing it to fail in any way. The weight of the car empty is 37,100 pounds, which is much lighter than the 50-ton steel hopper car of ordinary design. About 400 of these

under the direction of the Ingoldsby Automatic Car Company, Chemical Building, St. Louis, Mo.

The Creco slack adjuster, applicable to either passenger or freight equipment, is one of the features of exhibit of the



The Ingoldsby 60-Ton Steel Dump Car—View with Drop Bottom Open.

cars are now in the service of the Colorado & Southern; Colorado Fuel & Iron Company; Imperial Copper Company, and others.

The average time required to unload the Ingoldsby car and close it ready for another loading is 40 seconds, and only one man is required for the operation. This is accom-

plished by the steep incline of the bottom sheets at the ends and the wide drop bottom doors at the sides. These are held in place by hooked levers, which are distinctly seen in the illustration, and all hooked levers on one side are actuated by a single handle for release. These cars were built by the American Car & Foundry Company, at its Detroit shops,

NEW TUNGSTEN DIFFUSING CLUSTER.

The tungsten diffusing cluster manufactured by the General Electric Company is a new and interesting application of the modern high efficiency tungsten lamp. While designed primarily to carry six tungsten lamps, any commercial type of tantalum or carbon filament lamps can be used after a slight adjustment of the holder mechanism.

This tungsten economy diffusing cluster, as it is termed by the manufacturer, fills the demand for a large lighting unit,



New Tungsten Diffusing Cluster.

having approximately the same power as the enclosed arc light. For store lighting, the 26-inch diffuser is recommended. For mill and factory work the 39-inch will be found most satisfactory as it gives somewhat better distribution and diffusion. The 39-inch cluster gives excellent results for mill lighting when equipped with three 100-watt tungsten lamps. This permits, for the same energy, somewhat closer spacing than arc lamps. By using various combinations of 40, 60 and 100-watt lamps the economy diffusing cluster provides a light of variable intensity with a wide range of wattage adjustment without mechanical change. The flexibility of this lighting unit, its high efficiency and the quality of illumination make it a competitor of the arc lamp that in the future must be reckoned with when lighting problems are under consideration.

"JANNEY X" COUPLER.

The McConway & Torley Company, Pittsburgh, Pa., the original manufacturer of the M. C. B. type of coupler, is exhibiting in connection with various types of couplers manufactured by it a new modification of the Janney coupler which has been designated as the "Janney X." In this coupler the aim has been to embody with the simplicity of the original Janney coupler having a vertical locking pin, the up-to-date requirements of a "lock-to-the-lock," providing effectually against any creeping of the lock or accidental uncoupling, a "lock-set," making it unnecessary to lock up the uncoupling lever on the end of the car in shifting, and a "knuckle-opener," complying fully with all the requirements and recommendations of the M. C. B. association as to the functions desirable in an automatic coupler. The M. C. B. specification for a "knuckle-opener" requires one "which will throw the knuckle completely open and operate under all conditions of wear and service," and in this coupler this has been fully accomplished, as the knuckle-opener will open the knuckle to its fullest range of movement from either a fully closed position or from any partially open position. The old style of Janney coupler has always been popular with the

trainmen on account of its simplicity, and this desirable characteristic has been carefully preserved in this new design.

RYERSON KEY-SEATING MACHINE.

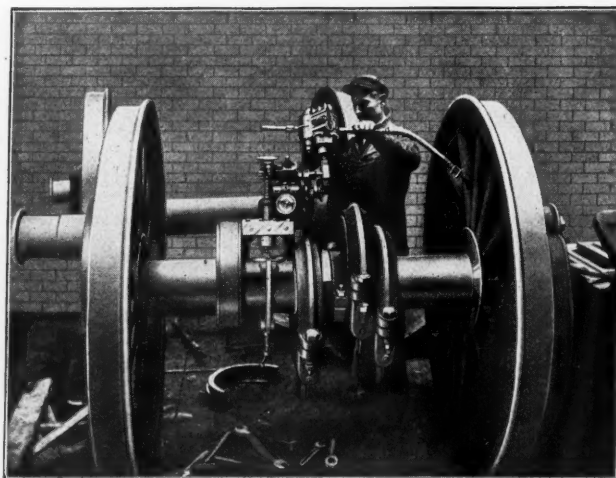
This Ryerson portable automatic key-seating machine is designed for automatically cutting key-ways in locomotive axles either before or after the engine is assembled. The advantages of a machine of this kind are apparent to every one who is acquainted with the difficulties encountered in locating and cutting key-seats for the eccentrics.

The use of the machine avoids the possibility of the key-seat in the axle and eccentric not corresponding, which is often the case when key-ways are cut before the wheels are pressed on the axle. For repair work where the old driving axle is retained, it frequently happens that the key-way in the eccentric and the axle do not correspond. This contingency is, at the present time, overcome by the use of an offset key. The Ryerson key-seater can be used for re-cutting the old key-way in the axle to correspond with the eccentric, thus obviating the necessity of using an offset key with its correspondingly weakened construction.

The machine is so designed that it will cut as close as one inch from the driving box, while on the other hand the adjustment is such that any standard size key-way can be cut.

Also, the cutting is done within the base of the machine, thus making the machine compact and permitting its use for eccentric cutting on axles where the distance between the eccentrics is very limited. The base of the machine which fits on the axle is 8½ inches long over all.

The machine is operated by an air drill or electric motor, the motor being connected to the machine by means of a taper shank, which is part of the machine. The motor should operate at between 300 and 450 revolutions per minute. Both the vertical and horizontal feeds of the machine are entirely automatic so that no attention is required beyond the placing



Ryerson Key-Seating Machine.

of the tool in position. The machine weighs approximately 100 pounds. It can be operated in any position on the axle and the claims for it are economy of time and perfect work.

The machine can also be used for key-seating axles for driving wheels, cutting key-ways in shafts, etc. The machine is handled exclusively by Joseph T. Ryerson & Son, Chicago.

The Cibulas ventilating sash operator is receiving considerable attention from the master car builders. It is shown at the exhibit of the G. Drouve Company, at space No. 471. The operation of deck lights both ways from one point is a new improvement in this class of railway equipment, and a visit to the exhibit is worth while.

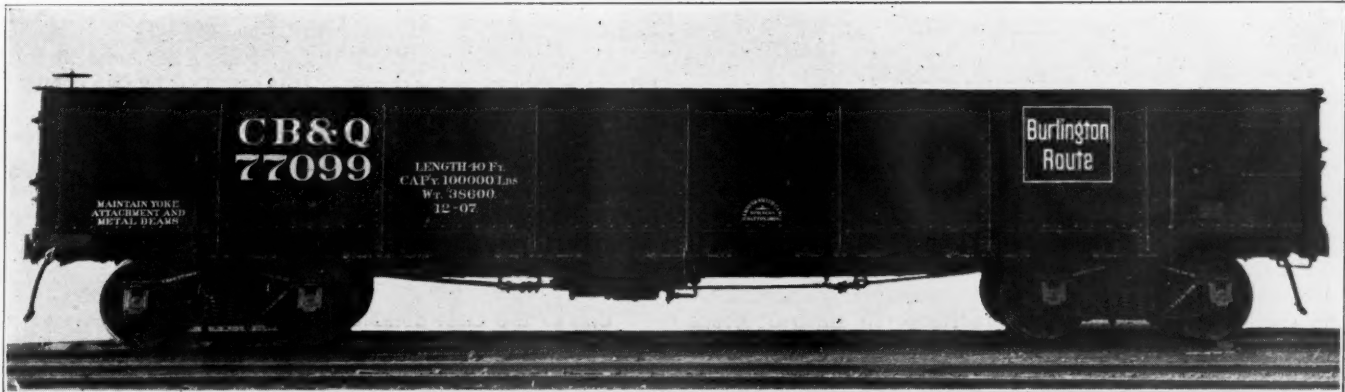
THE BARNEY & SMITH CAR COMPANY.

The Barney & Smith Car Company of Dayton, Ohio, which has been kept fairly employed during the dull period, recently completed a number of compartment sleeping cars for the New York New Haven & Hartford, which are now in regular service between New York and Boston. The company is now busily employed on an order for sleeping cars for the Grand Trunk Pacific.

The 50-ton steel gondola cars recently completed by the Barney & Smith Company for the Big Four and the Chicago

OXY-ACETYLENE WELDING AND CUTTING.

A process of welding and cutting iron, steel, copper, brass and aluminum castings and forgings, especially in connection with light pieces, is one which promises to come into more extensive use as the process becomes better known. By the use of a small flame a combination of oxygen and acetylene gases, fed to a torch from high pressure containing vessels, temperatures from 4,000 deg. to 6,000 deg. Fahr. are obtained. The direct result is the concentration of an intense heat to a small surface and the uniting of the pieces to be welded such



Barney & Smith 50-Ton Steel Gondola Car for the Burlington.

Burlington & Quincy are here illustrated. The cars for the Big Four have twin hoppers, while those of the Burlington have hinged drop doors operated by shaft with ratchet handle and chain.

The T. H. Symington Company is exhibiting a dust guard which embodies the three points which seem to be essential in a guard in order to meet the general favor of motive power officials and purchasing agents—low cost, efficiency and absence of all liability to wear the dust guard seat of the axle. The body of this guard is of canvas of sufficiently greater width and depth than the slot of the journal box to make the

as to prevent a detection of the joint when the surface is smoothed. Different metals, such as brass to steel, are easily welded. Cast pieces are also joined in a permanent way. In cases of castings containing blow holes, this process provides an equal of a new casting by welding in additional metal. Bosses may be placed in instances of revised designs and this without the necessity of disassembling the machine or group of pieces of which the casting of revised design is a part. The various parts of a machine may be welded together, thus doing away with the use of bolts and nuts. This process is of great importance in the bonding of rails of electric roads, giving a bond which it is practically impos-



Barney & Smith 50-Ton Steel Gondola Car for the Big Four.

edge turn over at the bottom and sides, thus forming an effective joint all around. A close joint is made around the axle by means of wood segments securely fastened to both sides of the canvas by small wire nails. The top edge is fastened between two wood strips of slightly shorter length than the slot. These strips are driven in the slot in the same manner as the ordinary closing plug, thus sealing the opening into the slot and supporting the upper portion of the guard. Motive power officials who are interested in a cheap and efficient dust guard are invited to make a careful examination of this device in the Symington company's booth at space No. 367-377.

sible to break and a joint of very low resistance. Notwithstanding the intense heat required in some instances approximating the 6,300 deg. Fahr. of an electric arc, there is said to be no burning or crystallizing of the metal.

In cutting metals, it is said that this method is most rapid and easily performed. The process is that of a chemical action of disintegration of the metal along the narrow path of the flame. The heat is so intense as to cause the carbon in the metal to be held in suspension, at which point, an additional jet of pure oxygen is turned on, which unites with the suspended oxygen and leaves the narrow opening which becomes the cut. Sheet metal up to 12 inches in

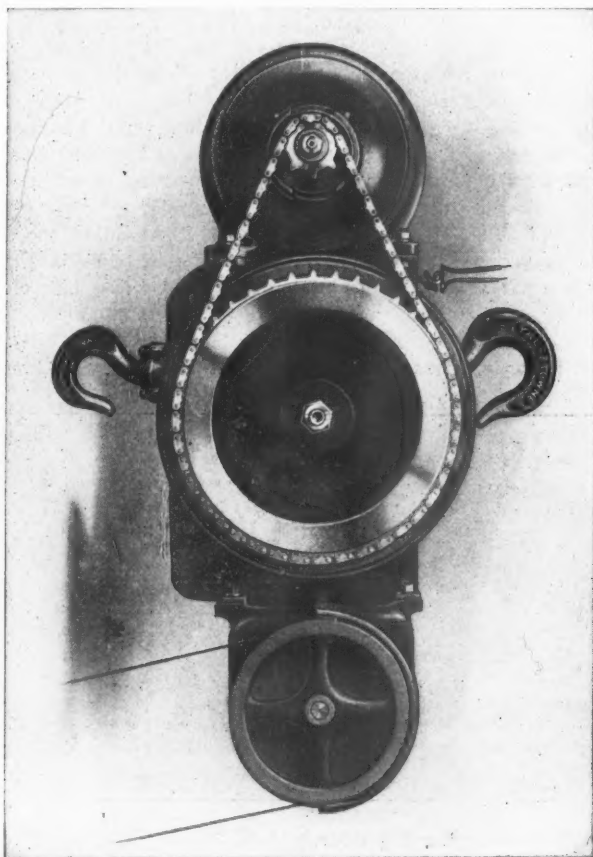
thickness may be cut by this method of disintegration of the metal by the flame.

The oxy-acetylene apparatus consists of a pressure generator, producing acetylene direct from carbide tubes for the compressed oxygen; torches with tips of different sizes, together with controlling pressure gages for both acetylene and oxygen vessels, and high pressure connections and attachments.

This apparatus provides an ideal installation for automobile building and repair shops in connection with small part welding. The Davis-Bournonville Acetylene Development Company, New York, is the builder of the apparatus.

Y & T ELECTRIC HOIST.

The hoist here illustrated is in a class between the chain block and the heavy duty electric hoist or crane. It is from five to ten times as fast as a chain block and will do the work of several ordinary laborers. It solves the problem of short frequent lifts, whether handling 50 pounds or a ton. It is especially economical for serving machine tools, running on trolley track, transporting raw material to the foundry or machine shop, serving individual operators, whether making castings or machining, transporting the finished pieces to the assembling shop, and there handling the pieces in erecting. It may be attached to a small traveling crane,



Y & T Electric Triplex Hoist.

swinging jib crane, trolley track, or it may be lashed to shear poles or temporary rigs.

This new hoist consists of the regular Triplex block driven by a motor. To insure increased wear and strength, for power service, the one ton electric Triplex hoist is made up of the regular two ton hand hoist. This enables the regular gearing parts of the Triplex block to be used in making up and renewing parts of the electric Triplex hoist.

The entire machine is constructed on lines of the utmost simplicity, to facilitate its care and operation by those who are

not skilled in electrical engineering. The motor is of the series wound Crane type, strongly constructed and suitable for the varying loads and speeds in hoisting work. The power is transmitted to the hoist through a sprocket, driving the gear of the hoist. This insures a highly efficient machine, and the lowest possible current consumption. To positively sustain the load at all times a Weston brake is provided.

An added convenience is the hand wheel, so that the hoist may be operated by a hand chain, the same as a chain block. If for any reason power is not available, the hoist is not tied up. This materially increases its usefulness for a place where it is required to make a few lifts at night, or at any time of the day when the power is shut off.

Its installation simply involves hooking the hoist up and attaching two wires for current. It is operated by two pendant cords.

Whether lifting ashes or serving the most complete system of shop transportation, the hoist is equally convenient and economical. Two of these machines are shown operating at the Yale & Towne exhibit, space No. 215.

IMPROVEMENTS IN STEEL CASTINGS.

One of the most notable steps in the use of cast steel a few years ago was the building of the cast steel freight car truck. The frame, spring seat, brake hanger lugs and journal boxes are cast in one piece. This design of truck has been in service long enough to show its economy as compared with other types of freight car trucks. The rapidity with which these trucks can be assembled and knocked down, their economy in first cost, reduction in number of parts (thus reducing storeroom stocks) facility of inspection of brake rigging, increased life over all other types of trucks,—are a few of the points in their favor which appeal to the up-to-date railroad man.

It is necessary, however, for railroad officials to exercise the utmost care in specifying steel castings and in determining where they shall be purchased. It is ridiculous to expect to purchase steel castings at the same price as malleable castings, or rolled or pressed steel parts. The cost of making good basic open hearth steel castings is greater. The offset is in the greater life. Railroads have been made the innocent victims of inexperienced foundries, and some roads are, in consequence, hostile to cast steel. On the other hand, in some cases the roads themselves have been at fault by encouraging too sharp competition, and giving orders for steel castings, cast steel bolsters, etc., to the lowest bidders without taking collateral matters into full account—knowing well that good material could not be produced at such figures, or that the weights would be "skinned down" so low that there would be no reasonable factor of safety in the castings.

Railroads cannot get something for nothing any more than a manufacturer can get labor and material gratis. Then, too, under stimulus of an almost incredible growth of business, many manufacturers have been encouraged to overtax the limit of the capacity of their factories, and to neglect, oftentimes, refinements in manufacture or inspection which afterward proved detrimental.

Among the manufacturers who have taken an active interest in improving the quality of cast steel and extending the variety of its applications, the Atha Steel Casting Company, Newark, N. J., is entitled to rank as a pioneer, and its constant endeavor has been in the direction of removing the causes of the hostility above referred to.

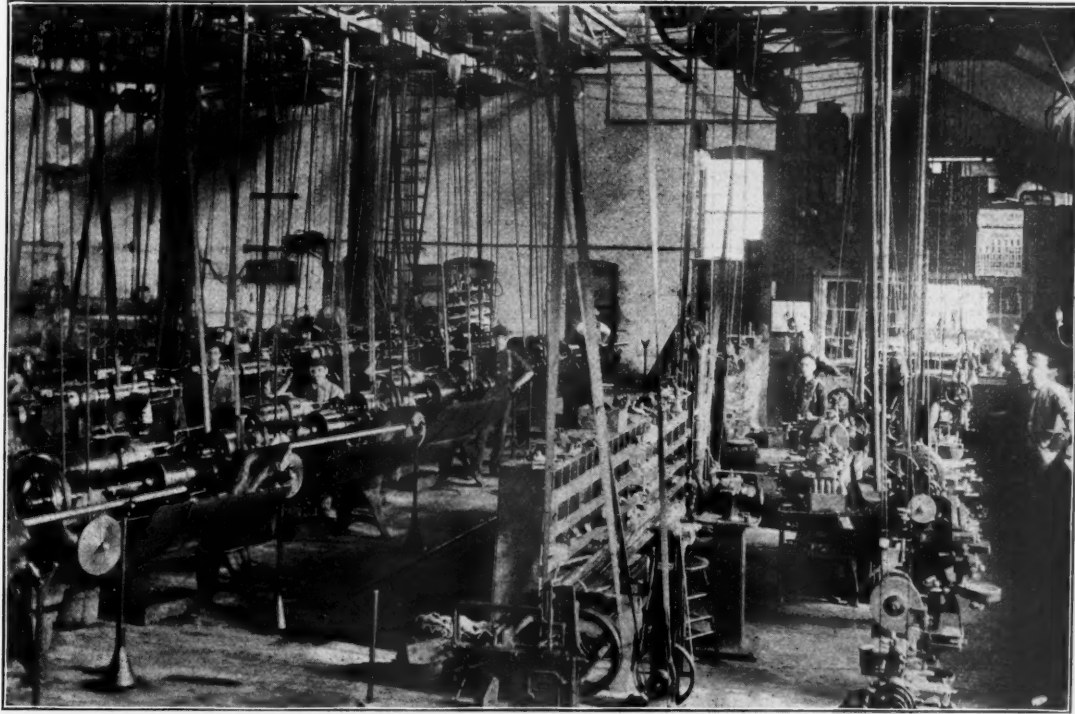
Unless you are blindfolded you will see the Dixon train of cars modelled in the sand close to the Hotel Shelburne, and also the magnificent photograph of the company's large plant in the display window of Albert's studio, opposite Young's Million Dollar Pier. Ask Dixon for a pencil, or most anything you would like.

THE FLANNERY BOLT COMPANY.

The Flannery Bolt Company has by persistent and well directed effort built up an extensive business with the Tate flexible staybolt. This bolt was placed on the market in the

pany shipped over 800,000 Tate bolts in the year of 1907; users of the Tate bolt include a hundred of the leading railroads and locomotive builders.

The utmost care is exercised throughout the factory opera-



The Flannery Bolt Company—View of Machine Shop.

early part of 1904, it being the only article manufactured by the company. Its plant is at Bridgeville, Pa., and is shown in an accompanying engraving.

The service records of the Tate Flexible Staybolt have in

tions and shop practice to manufacture the Tate bolt in a most perfect manner. The bolt consists of three parts: Cap, of drop forged steel; sleeve, of cold rolled steel, and bolt, of good staybolt iron. All materials used are of the best quality



The Flannery Bolt Company—Shipping Room at Factory.

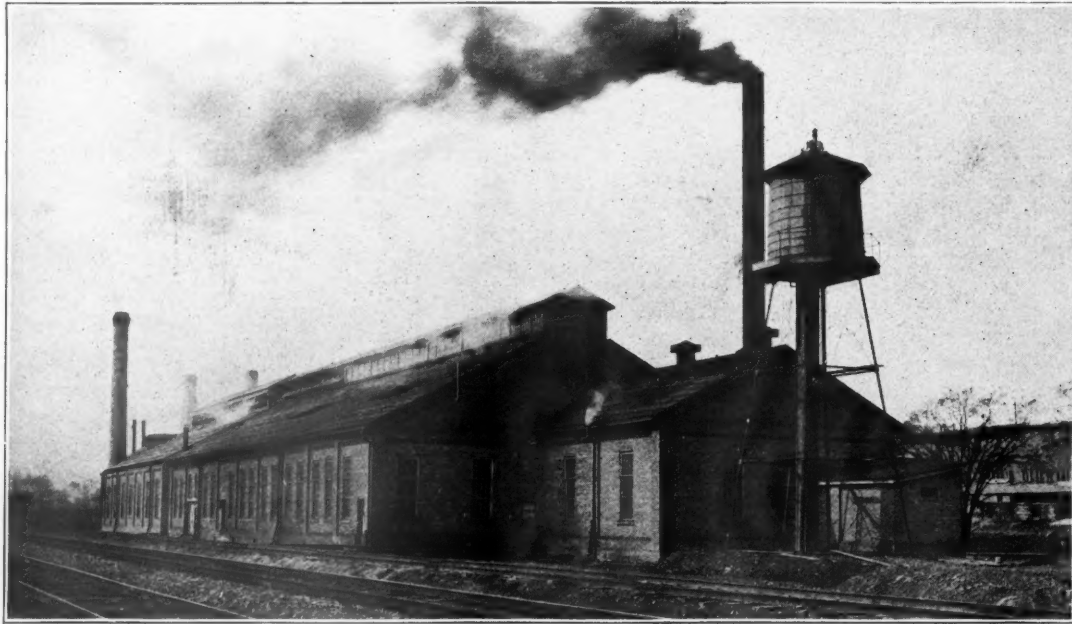
all instances proved the merit of the appliance as most necessary and economical for high pressure service in modern locomotive practice, and the sales for the Tate Flexible staybolt have steadily increased month to month and the com-

for the purpose, and the system of machining and gaging insures uniformity of sizes and interchange of parts throughout. The packing and shipping departments exercise great care in the crating and boxing of the threaded parts, and keg

securely the plainer parts, labelling each with the necessary instructions.

The officers of the Flannery Bolt Company are James J. Flannery, president; A. R. Hamilton, vice-president; A. A. Neeb, treasurer; Joseph M. Flannery, secretary; B. E. D. Stafford, general manager; J. Rogers Flannery, general sales

Transcontinental railroad car cleaners (small and very compact to be installed in car and used daily en route if desired.) (9) Vacuum cotton picking machine, which do the work of over 56 negro pickers. (10) Special sand blast and disinfecting apparatus. (11) Complete equipments for gages, tailor shops, laundries, cleaning establishments, and many other spe-



The Flannery Bolt Company—Factory at Bridgeville, Pa.

agent; Tom R. Davis, mechanical expert, and F. K. Landgraf, shop superintendent.

The sales representatives are Harry A. Pike, of New York, eastern sales agent; W. M. Wilson, of Chicago, western sales agent; and the Commonwealth Supply Company, of Richmond, Va., southeastern sales agent.

NORTON PISTON ROD GRINDER.

A piston rod which shows the accuracy of work obtained by the Norton piston rod grinder, which is in use in many railroad shops, is a feature of the Norton Grinding Company exhibit. It forcibly illustrates the accuracy obtained by grinding such a rod, and when the fact is considered that this rod was repaired without turning and in less than half an hour's time, it becomes interesting to mechanical men.

It is interesting, also, to note the condition of a similar rod on either side of this ground piston rod, one of which was filed and polished in the ordinary manner, the other turned and rolled. Brass rings surrounding these rods can be moved up and down on them to show the accuracies and inaccuracies of the work, the rolled rod and the filed and polished rod showing large inaccuracies, while the ground rod appears to be practically perfect. Another interesting fact is that the ground rod costs less for labor than either of the other two.

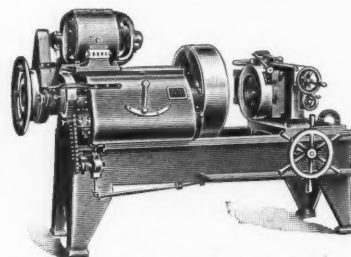
THURMAN CLEANING SYSTEMS.

The Thurman systems of vacuum and compressed air cleaning include the following and many special types designed by request: (1) Vacuum pump systems (both straight vacuum and suction pump). (2) Combination vacuum and compressed air (plants for buildings and residences). (3) Portable house cleaning machines (in over 400 cities). (4) Railroad terminal cleaning plants. (5) Railroad coach and sleeping car cleaning devices. (6) Steam jet vacuum plants. (7) Vacuum system (electrically driven and Portable for use in railroad car cleaning where electricity is available). (8)

cial uses. The General Compressed Air & Vacuum Machinery Company of St. Louis owns and operates these Thurman systems, and are prepared to submit plans, specifications and estimates on any of the above systems. The company claims to be the pioneer, and is now working on its new factory, which will cover several acres of ground. John S. Thurman is the president of the company, and Reuben C. Hallett manager of the railroad department, and Frederic A. Coolidge advertising manager, are representing the company at the conventions, space 322.

STOEVER MOTOR-DRIVEN PIPE MACHINE.

The application of a motor drive to pipe machines built by the Stoever Foundry & Manufacturing Company, Lebanon, Pa., is a very simple matter, as all the belt-driven machines



Stoever Motor-Driven Pipe Machine.

are made with a single pulley drive, the changes of speed for the spindle being secured by special gearing. The illustration herewith shows the general design of the No. 3 and No. 4 machines, having 3-inch and 4-inch capacity respectively. A constant speed motor is placed above the main bearings

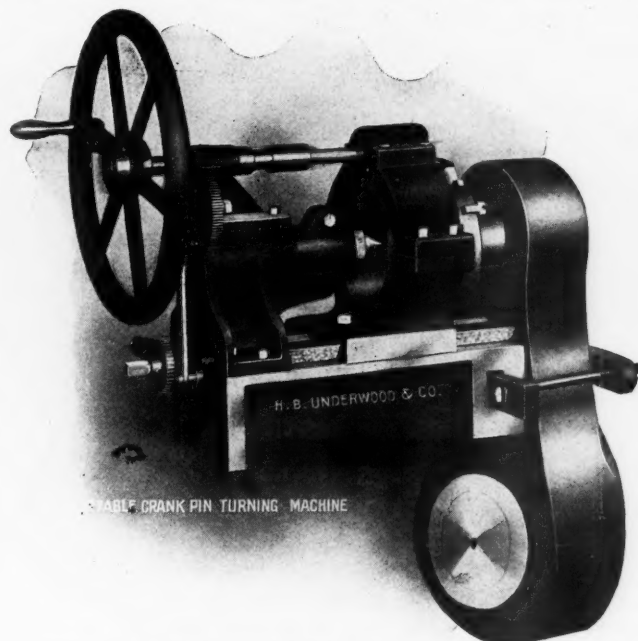
of the machine on a suitable table, and connected by means of silent chain to the main driving gear of the machine. The changes of speed for the spindle are made as in the belt driven type. This is a very compact and serviceable outfit, low in first cost as well as in operating expense.

Brewer Bros. Company, Philadelphia, Pa., has an exhibit of small steel and iron forgings, including cleats, chisels and packing hooks. The three Brewer brothers are in attendance.

UNDERWOOD PORTABLE CRANK PIN TURNER AND REBORER.

To meet increased demands for efficiency and speed, H. B. Underwood & Co., of Philadelphia, have put out a new crank pin turner and reborer designed for general work on locomotives and engines having dish and plain cranks. The machine is quickly adjusted, firmly held in place and, when necessary, will rebores the hole and at the same setting finish a rough turned pin after it is forced in and riveted.

The machine has a bed, with a suitable angle plate on the end, with a large slot running through it, made for a strong clamp of heavy dimensions for clamping to the crank. Should the crank not be machined true, an auxiliary plate is clamped to the crank in a secure and true manner, and the machine is then fastened to this plate. The machine also has a large adjustable center, which is arranged to go into the original center of the crank pin, thereby giving it the original alignment. This assists in testing the pin, by allowing the revolving cutter to turn off the eccentric part, which is usually left by wear. Heavy cuts can be taken without chattering and an oil or water finish made so accurately that variation cannot be found with a micrometer.



Underwood Portable Crank Pin Turner and Reborer.

The machine can be taken off the bed in five or ten minutes, and replaced exactly central and true. It is a great convenience in handling the larger sizes (15 to 20 inches), to place the bed and attach it near its true position, then place the cutterhead, and lastly the driving and feed mechanism. This latter feeds either way, and can be adjusted from one notch to several, giving a variety of feeds to suit the material and operator.

The driving shaft is telescoped so that it drives the cutting tool forcefully all along the travel. A cut can be started in the center of the pin and run up to a shoulder or collar without changing the tool which is a straight flat piece of good tool steel, securely held and adjustable.

The machine will carry a boring bar, which is placed in the center and through a disc, fitting in the circular cutterhead, for reboring a hole. The same feed operates internally as accurately as externally, when turning off the pin.

The dismantling feature of the machine is absolutely necessary when the crank pin hole is to be bored and a new pin put in. The bed is left attached to the crank, with the feed and turning mechanism removed, then the pin can be forced in, secured, and absolutely returned to size, perfectly true, as to hole and bearing surface.

The machine is built in the following sizes:—No. 1 taking from 7 inches diameter and down, No. 2 taking from 12 inches diameter down to 6 inches, No. 3 taking from 15 inches diameter down to 10 inches and No. 4 taking from 20 inches diameter down to 15 inches.

The designing of this tool resulted from the demand to re-turn pins of large diameter, and also to renew worn and loose pins when the hole is bad from looseness of the pin.

MACHINE SHOP ECONOMY.

The question of the economy and convenience of electric drive in machine shops is so well settled in the affirmative as to require little comment. The saving in power, light, space and power house capacity and the convenience of arrangement, accessibility and speed control of motor-driven tools have been established as facts, and the question has resolved itself into what system of speed control is best adapted.

The systems of speed control most generally used are, in the order of their development, control by armature resistance, by field weakening, by multiple voltage and by special design of motor. Control by armature resistance is very wasteful of energy, and special motor design means dependence on a particular manufacturer. The field weakening, constant voltage system and the multiple voltage system are systems that admit using motors that can be purchased in the open market. Both of these systems have their advantages and disadvantages, which must be taken into consideration in determining which is more suitable for any particular case.

The following tabulation of the relative advantages and disadvantages of the two systems is submitted by the Crocker-Wheeler Company, of Ampere, N. J., a concern which has had 20 years' experience in building motors and applying them to machine tools of every description:

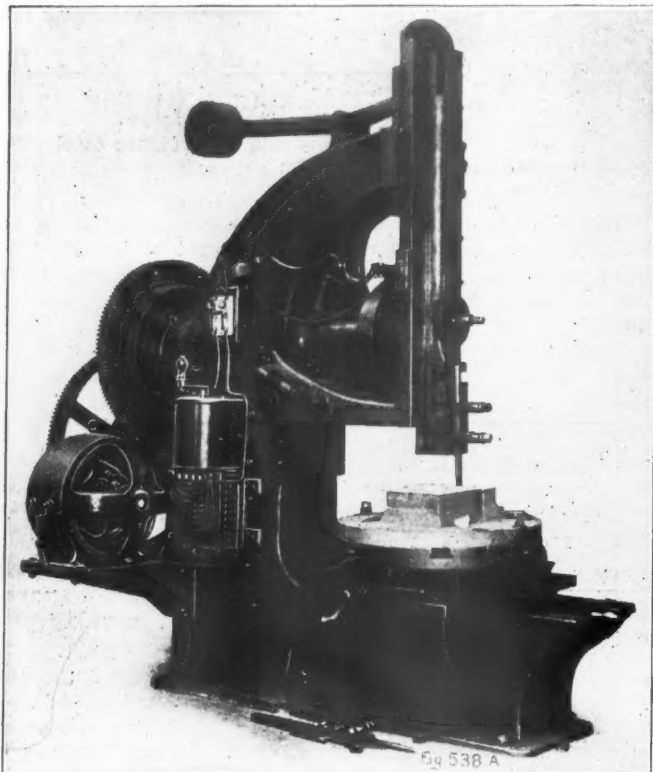
Field Weakening—Disadvantages	Multiple Voltage—Advantages.
Permissible torque least at high speeds.	Constant torque.
Maximum horsepower and over-load capacity are lowest at high speed.	Horsepower increases with speed.
Large motors must be used to take the load at high speeds.	Normal size of motors used.
Special design of motor required.	Standard motors used.
Motors are expensive.	Motors comparatively cheap.
Danger of motors racing if load is suddenly removed.	No danger of motors running away.
Field Weakening—Advantages.	Multiple Voltage—Disadvantages.
No auxiliary machine required.	Small balancer required.
Only two wires required.	Four wires required.
Simple switchboard.	Switchboard must have balancer panel and wiring.
Wiring not expensive.	Wiring expensive.

The convenience of the two systems is about equal. The real determining factor is that of cost. On the one hand there is the higher cost of large and special motors and on the other hand the higher cost of wiring and switchboards. Which of these is the more important must be determined in each particular case. For this reason, the Crocker-Wheeler Company advocates the 4-wire multiple voltage system for certain installations and builds a line of field weakening motors for others.

In shops where all machines require speed variation the multiple voltage system usually works out cheaper. Where only a small proportion of the tools need adjustable speed drive or where tools requiring low torque at high speeds are used the installation of a balancer would be an unnecessary expense. In railroad shops the multiple-voltage system

is generally recommended, though special conditions may even here in small shops make field weakening control advantageous.

Among the railroad shops equipped by the Crocker-Wheeler Company with multiple voltage systems the most notable are those of the Pittsburg & Lake Erie at McKees



Machine Shop Economy—Crocker-Wheeler 6½-Horsepower, 230-Volt Field Weakening Motor Applied to Shaper.

Rocks, Pa., and the Lake Shore at Collinwood, Ohio. Among large industrial plants so equipped are the shops of the Crocker-Wheeler Company, Ampere, N. J., covering 25 acres; John Simmons Company, New York City; the National Tube Company, McKeesport, Pa. The gun shop of the Washington Navy Yard and the Watervliet Arsenal are also equipped with multiple voltage motors. These plants have all been in successful operation for a number of years.

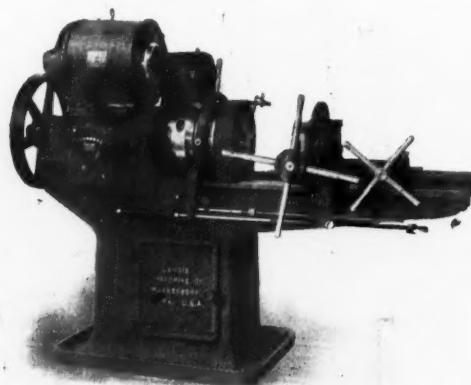
DIXON GRAPHITE PRODUCTS.

The Joseph Dixon Crucible Company continues to maintain its reputation as the largest producer and manufacturer of graphite for railroad use. The Dixon Company's lubricants, crucibles and pencils are in universal use. Dixon's silica-graphite paint, so well known as a protective coating for steel cars, covers nearly everything in Atlantic City, in the way of exposed iron. This sterling preparation was selected by the government engineers for the United States lighthouse, on which Dixon's black was used for the centre division. The iron work of the Young's Million Dollar Pier is painted with Dixon's silica-graphite paint; likewise the iron work of the boardwalk, the iron poles and refuse boxes. Haddon Hall's roof, looking so fresh and new, is painted with Dixon's silica-graphite paint, and the Chelsea Hotel also has its roof protected with Dixon's famous preserver. The stack at the Hotel Jackson isn't varnished every morning—it was painted five years ago with Dixon's silica-graphite paint.

Edward A. Johnson, sales manager of the Watson-Stillman Company is distributing to his friends a souvenir paper cutter.

THE LINCOLN MOTOR FOR BOLT AND PIPE MACHINES.

The accompanying illustration shows the Lincoln variable speed motor connected to small bolt machine, where this kind of drive is especially advantageous. On a pipe threading machine it is necessary to be able to obtain any speed, in order to have the correct speed, so that the dies will give the best results, and it may be surprising to know that there are nearly a thousand different speeds which are required to meet various conditions under which a threading machine works. The average bolt machine can cut about 10 different sizes of pipe ranging from ¼ inch to 2 inches.

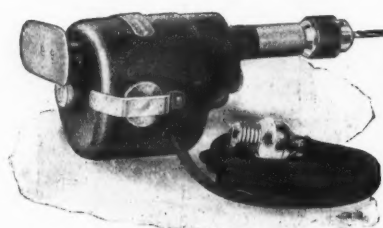


The Lincoln Motor for Bolt and Pipe Machines.

The materials are galvanized steel, galvanized iron, steel, iron, extra heavy galvanized steel, extra heavy galvanized iron, extra heavy steel and extra heavy iron, eight kinds of pipe which require different speeds for maximum output. If there are on the average two sizes of thread, and the dies are tempered to six degrees of hardness, the total number of speeds required would be 10 x 8 x 2 x 6, or 960. These figures represent the experience of large pipe manufacturers, who have adopted the Lincoln motor.

ELECTRIC BREAST DRILL.

So much of the repair work in a railroad shop depends on the drilling of small holes in large or very heavy castings that the employment of a suitable drill is a considerable item



Electric Breast Drill.

in the economy of the shop. The small hand drill first used was so slow and expensive that it has been almost entirely abandoned. This was followed by the air drill, but air has in many instances

given place to the more convenient and more economical electric drill. Where the air drill was complicated by a number of valves, the electric drill has no valves and the air hose is replaced by a flexible lamp cord. The electric drill shown here is one developed by the engineers of the General Electric Company. The tool is furnished with a Jacob chuck which takes any drill up to 23-64-inch in diameter operating satisfactorily in brass, cast iron and similar metals as well as in wood.

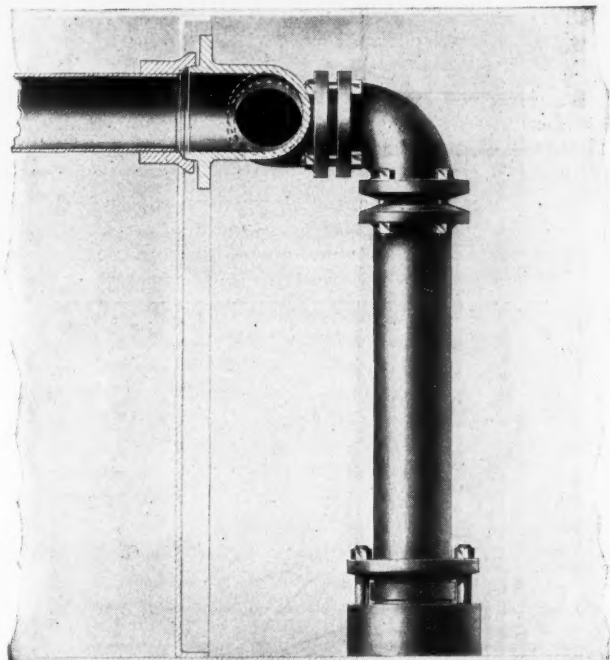
The hard usage to which such a drill would probably be subjected in a shop has been carefully considered in the design of this machine, and its solid compact structure almost precludes accident unless caused by most careless handling.

LOCOMOTIVE FRONT END STEAM PIPES.

In addition to frequent leaking at joints, the disadvantages of the present form of front end steam pipes make rather a formidable list, including the variety of diameters when a very few diameters would answer so long as the volume of steam from the dry pipe is carried, the crooked pipes which make rights and lefts necessary, the variations in heights from dry pipes to cylinder connections, and the differences of spread in the centers of cylinder connections which make it necessary to carry a multitude of patterns and a big stock of castings.

Dependence is placed upon scraped and ground joints for tightness at joints, and as this is a very sensitive and delicate contrivance under good conditions, it is not surprising that it frequently fails when subjected to the very severe conditions found in the front ends of locomotives. While leaking joints are not so prevalent in large locomotives of recent design, this is because of the larger and more numerous bolts used in the cylinder saddles and in the steam pipe connections, but even in these locomotives scraped and ground joints are used with the attendant expense and occasional leaks and the multiplicity of patterns and large stock of castings are not reduced.

The accompanying illustrations show a design of front end steam pipe recently put on the market by J. L. Yale & Co.,



Yale Locomotive Front End Steam Pipes—Side Sectional Elevation.

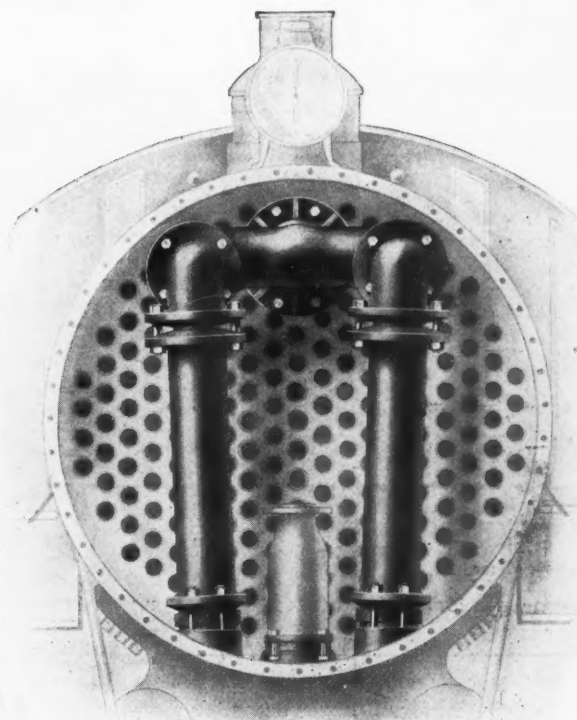
617 Railway Exchange, Chicago, which is intended to do away with brass rings, scraped and ground joints, rights and lefts in the side pipes, the multiplicity of patterns, large casting stock, and with leaking joints.

The joints of the pipes are neither ground nor scraped, but are simply straight taper turned joints that make up tight and yet permit of liberal movements caused by expansion and contraction and vibrations. This design of joint is the same as that used in Universal cast iron pipe manufactured by the Central Foundry Company and sold by Yale & Co.

Steam pipes of this design have been under test for more than two years on engines the front end steam pipe joints of which were frequently leaking notwithstanding great care and expense being put upon them. The only change made was that of taking out the old pipes and joints and the putting in of Universal pipes instead.

With Universal pipes but two or three diameters are

used and these are sufficient to cover the range of diameters of dry pipes. The nigger or tee head, elbows and straight pipes are standard for each of the two or three diameters. There are no rights or lefts. The straight pipes are all of



Yale Locomotive Front End Steam Pipes—Front Elevation.

the same length, and differences in heights are taken care of by the short nipples between the lower ends of the vertical pipes and the cylinder connections. The flexibility of the joints permits of swinging the lower ends of the pipes in or out to conform to the different spreads of cylinder connections. No work is required on the joints after they leave the lathe, and no scraping or grinding are required when replacing pipes.

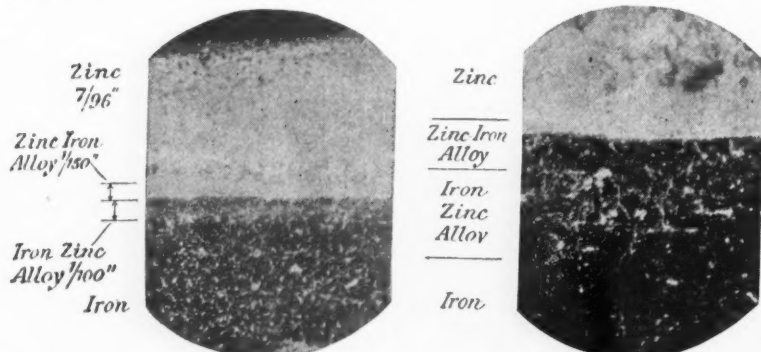
It is not absolutely necessary to discard the present forms of pipes in order to get the benefits of the Universal joint as the joints can be applied to the present designs of pipes, however, in order to get the full benefit of the design of pipes presented the manufacturers recommend their gradual substitution for the present pipes.

Pocket List of Railroad Officials.

In connection with a certificate of circulation issued under date May 12, 1908, by the Association of American Advertisers in favor of the Pocket List of Railroad Officials, the publishers have prepared a statement showing in detail the distribution of No. 54, which is the latest issue. Of the 19,965 copies of that issue, less than 1,000 of which were used for samples and other purposes, it appears that Chicago leads the list, receiving 1,604 copies, while New York City takes 1,503, and the rest are miscellaneous distributed to every State in the Union in numbers fairly proportionate to the magnitude of the railroad interests therein. Alaska gets three copies, the Philippines the same number; Porto Rico takes four and the Hawaiian Islands four; Pennsylvania takes 1,058 outside of Philadelphia and Pittsburg, which two cities take as many more; while Canada and Mexico use 833 and 371 respectively. Probably the most satisfactory feature of the whole is that every copy is used almost daily.

RUST PROOFING PROCESS.

The so-called sherardizing of iron, steel and other articles to make them proof against rust and corrosion is similar in many respects to the process of galvanizing. Instead of coating a metal by an electric or dipping process, sherardizing is accomplished by heating in a closed drum, the articles packed in zinc dust. This zinc does not merely coat the metal, but enters the pores and really becomes a part of its exterior layer, forming a surface alloy. The series of microphotographs show the manner in which the zinc enters the metal.



Microscopical Sections, Showing the Alloying of the Coating with the Iron.

The condensation of the fumes of spelter or zinc furnaces in the shape of dust, the essential components of which are metallic zinc, about 80 per cent, and zinc oxide, about 20 per cent produces an impalpable power. The presence of zinc oxide prevents the dust from melting or becoming pasty, even at higher temperatures than those used in the process, which range from 400 degrees to 600 degrees F. The process is simple, not requiring the use of skilled labor. The articles to be treated are thoroughly cleaned by some mechanical process to remove all scale, rust, tar, pitch or paint. This provides a perfectly clean surface of the metal in direct contact with the zinc dust. The cleaned articles are then packed into a sherardizing drum, intimately mixed with the zinc dust, and a more or less air-tight lid closes the cylinder drum, which is then placed into an oven, preferably gas, and gradually heated to a temperature of from 500 degrees to 600 degrees F. The thickness of the coating deposited upon the article depends upon the temperature of the oven and the length of time in the furnace. The drum is then removed and when sufficiently cooled to permit of handling the articles are poured into a sieve which separates the loose dust from them. No cleaning or shaking process is required, the articles being ready for immediate use. The coating which results from this process is such that the original shape and size of the article are not changed. When sufficient clearance is given, it is said that a sherardized nut will run onto a sherardized bolt easily, no recutting of threads being necessary.

Some misunderstanding has resulted in regard to two features of this process. When a thick coating is deposited on an article the top part is more crystalline, and if the article be roughly handled or bent a portion of the sherardized coating is liable to crack or flake off, and many imagine that the entire coating has become removed. This is not the case, for the malleable metallic portion and the alloyed portion are still intact. The other feature is that this top portion of the coating, when exposed to rain water or salt water, is partly converted into either hydroxide or carbonate of zinc, giving a buff colored dark yellow or whitish powder, which many have supposed to be iron rust from the article itself. This is not the case, as the more solid portion of the coating will be found to be intact beneath this powder.

The effect of this process upon steel should be readily understood. The heating and the cooling are gradual because the zinc dust is a bad conductor of heat and therefore no sudden high temperature can be produced, and the articles are subjected to a process of annealing as well as sherardizing. This is a marked contrast to the sudden plunge of an article into molten zinc with a sudden cooling. Mild steel, it seems, should be improved by sherardizing.

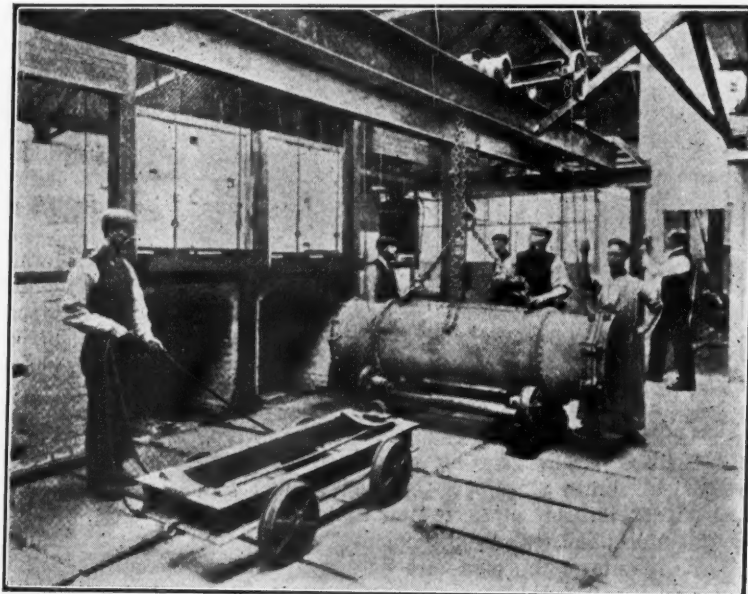
This process is especially adapted to smaller pieces, such as bolts, nuts, boiler tubes, castings, lag screws, chains, pulley blocks, pipe fittings, stocks and dies, forgings, tools and nails. This process is covered by patents in the United States and Canada, owned by the United States Sherardizing Company, New Castle, Pa.

MECHANICAL OIL PUMP FOR STEAM HAMMERS.

Oiling steam hammers by hand pump is irregular because it is done by the hammer operator whenever he happens to think of it. It is also likely to be inefficient and quite wasteful of oil, as the oil is introduced when the hammer is inoperative, the attendant being too busy with the lever to do oiling when the hammer is working. The result is that the hard service quickly washes out the oil and at the

time the lubricant is most needed it is lacking.

A mechanical oiler for steam hammers is made by the Madison-Kipp Lubricator Company, Madison, Wis. It is worked by the hammer and therefore oil is fed only when the hammer is in operation. The pump is made solidly and compactly without springs, valves or stuffing boxes, and is said to withstand successfully the jars incident to the hammer service. All the care and attention necessary from the operator is to fill the pump once or twice a day. It is claimed that the use of the mechanical pump saves as high as 75 per cent in oil over the hand pump method, and always 50 to 60 per cent. Also, that it minimizes the repair bills. Some



Sherardizing Drum Ready for the Oven.

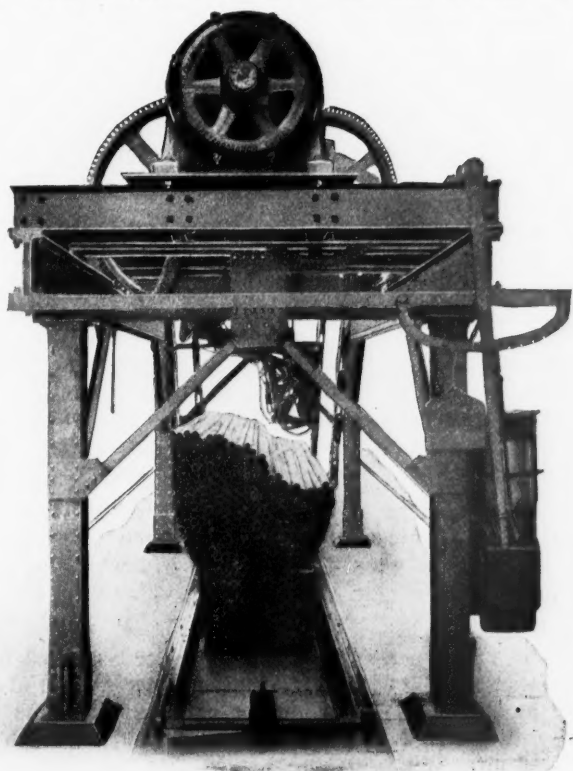
of the latest pattern steam hammers are equipped with mechanical oil pumps but in case an order is placed for a new hammer it will be well to inquire regarding this feature. For hammers already installed the saving through the use of a mechanical oil pump it is believed will warrant the cost of the pump.

The Lancaster Machine & Knife Works invites everyone to come to its exhibit at space No. 147 and see its machines bore square holes.

RYERSON FLUE CLEANING MACHINE.

The Ryerson flue cleaning machine comprises an overhead steel frame work and a concrete pit built under the floor of the shop and partially filled with water. Flues, while being cleaned, are suspended in the water by two specially made wide-faced, case-hardened, wrought-iron chains forming continuous loops in which the flues roll over and over upon themselves as the chains are driven. All gearing is overhead and usually is driven by a direct connected motor though if desired a belt may be used. To keep the flues in position, fenders are provided in the pit and these are made adjustable to flues from 8 to 20 feet in length. The rear chain is supported by a traverse carriage which is moved toward or away from the front chain by screws driven by the main driving motor, thus adjusting the chains to the length of flues handled.

An important advantage of the Ryerson machine is in the method used to lower the tubes into the pit and to remove them. This is done as follows: A car load of flues is run



Ryerson Flue Cleaning Machine.

under the over-head frame work, the chains are attached to the flues, the flues raised off the truck, and the truck run out leaving the flues suspended, as shown in the illustration, and they are then lowered into the pit and the rattling started. To remove them when clean and load them on the car this method is reversed.

The machine has a capacity to rattle 500 tubes 2½-inches in diameter at one time. To place the tubes in position to lower requires about four minutes; the only labor needed is that to push the car in position and adjust the chains. To lower the tubes into the pit requires one man one minute. The time required to remove the tubes from the machine is about five minutes and this also requires the service of but one man.

There is great economy of time in cleaning flues with this machine as it will take four or five times as many flues as the average size rattler and with only nominal cost for labor the flue cleaning expenses can be reduced to a trifle.

Another advantage of this machine is the great reduction in noise, the rattling taking place under water. Furthermore the water washes out the soot and dirt from the inside of the

tube at the same time that the scale and other material is being scraped from the outside.

The saving effected by these machines and their success in operation have resulted in their installation in many of the large railroad shops of the country and the manufacturers state that the Ryerson machines have been specified for virtually all the new shops built or planned within the last two years.

THE FLEXIBLE STAYBOLT.

By B. E. D. STAFFORD.

Prior to the advent of the flexible staybolt, the mechanical departments of railways were more or less disturbed over the constant breakage of the ordinary or rigid stay and the frequent cracking of firesheets. While earnest attention has been directed towards overcoming this phase of firebox maintenance, which at times runs into an expensive charge for repairs, all methods of improvement whether involving the use of better material, or more careful workmanship, were unsatisfactory towards accomplishing the desired results in the reduction of broken staybolts and cracked firesheets, to a point of safety and of economy in maintenance of repairs.

The firebox sheets were rigidly stayed, irrespective of the material of the staybolt, and regardless of how careful the work was assembled, and there was no provision to compensate for the expansion of the firebox, and the influence of expansion as a direct and disastrous force on all material involved was largely overlooked.

The temperatures of the furnace in locomotive fireboxes are so variable and so intense, that great stress is produced in the firesheets, and this stress is more or less disastrous to both sheet and staybolt according as the method of staying opposes the greatest or the least resistance to the force of expansion, as this is conceded to be directly accountable for the breaking of the ordinary water space stay. The firesheet being thin, in yielding to the force of expansion by buckles and bends between the rigid stays. Otherwise greater and more serious results would be produced, yet, while the material used may in a sense safeguard the life of the firebox, this does not imply that a rigid staybolt, provide for the expansion of the firesheet without finally breaking, or that a firesheet rigidly stayed can buckle and bend without final rupture and cracking.

When expansion is excessive, in any member of the firebox such should be allowed to take its natural course with as little resistance as possible, and where the stresses produced are liable to exceed the yield point of the material as is the case under the present method of rigidly staying locomotive fireboxes, the effort of mechanics in general should be to establish a high factor of safety and eliminate the causes of the deterioration and destruction of the material.

The breaking of staybolts and cracking of firesheets points to the conclusion that the locomotive firebox is too rigid, and the forces which tend to fatigue, rupture and break materials involved, are far in excess of those provided for in the calculations on which is based the present method of rigid staying.

Flexible staybolts properly distributed over a sufficient area of firebox sheet, to render plate expansion more in accord with the natural force, or less restrained to perform its real function, removes to a great extent and reduces to a minimum, the liability of bending and buckling the firesheet. When the firesheet is distorted by bending or buckling, a deterioration of the molecular structure of the plate is bound to occur, exposing the internal section of the material to rapid disintegration, leaving it inadequate to resist the forces of expansion and pressure, when rigidly stayed.

The service records of all flexible staybolts, whether of small or large installations, and regardless of the design of

bolt and the construction, point to the conclusion that flexible staybolts should be most earnestly considered as a most vital factor to employ in the construction of locomotive fireboxes for high pressure service.

In determining what flexible staybolt to use, careful consideration should be given to all features relating to the design and construction of the complete bolt to withstand constant service without liability to rupture, and capability of maintaining free movement under all conditions of incrustation. Particular attention should be directed to the principle of the design of its mechanical form, to ensure that when applied the bolt will readily and effectually resist the stresses, both tensile and transverse. A clear water space from sheet to sheet is preferable, and all bolts that obstruct the circulation by the protruding of sleeves or plugs, not only offers a lodgment for deposits of lime, but leaves the bolt shorter and less liable to perform its functions properly.

Means of inspection should be provided on all flexible staybolts for should the occasion arise, then the staybolt proper can be tested for the purpose of detecting rupture and breakage without damaging or in any way impairing the future usefulness of the complete bolt.

The results obtained in recent years by the use of the Tate flexible staybolt, regardless of the extent of its installation over a given area, prove that the life of both the staybolt and firesheet have been extended, and while no rule can be outlined as to the area of firesheet to cover with flexible staybolts on account of differences in the design and action of fireboxes under expansion and subject to varying methods of water circulation and of firing and washing out, the tendency in bad water districts has been to provide as large an installation of flexible stays as is possible in accord with the design of boiler and to allow for firebox expansion throughout in an unrestricted manner.

THE CHAMPION FORGE.

The accompanying engraving illustrates the Champion No. 401 steel rivet forge, manufactured by the Champion Blower & Forge Company, of Lancaster, Pa. This forge has been on the market nine years, and the manufacturer reports that it is used by practically 99 per cent of all structural steel

builders, railroads, bridge builders, boiler and structural iron workers of the world.

This forge is constructed from structural steel throughout, making it strong and durable. Its gearing is the No. 400 Champion "Patented" high speed spiral gearing made with high-class adjustable ball bearings throughout to insure ease of operation without noise. By reason of its construction it can be taken apart for transportation and again set up in a few minutes. It is guaranteed to produce a blast to weld



Champion No. 401
Steel Rivet Forge.

3½ to 4-inch iron in 10 minutes; the crank turns either way to produce blast. This particular design is made in three sizes with hearts 18, 22 and 24 inches in diameter respectively, and can be furnished with half hood or closed hood as desired.

The claims of superiority made for this forge include durability, efficiency and high capacity.

THE NEW CONDITION IN DRAFT GEAR.

One of the most important subjects that confronts the railroads of the present day is that of draft gear. In view of the increased capacity of cars, trains, and engines, and the acceleration of the movement of freight through terminal yards it is apparent that draft gear which was satisfactory 10 years ago is adequate to meet the conditions of today. It originally was satisfactory to permit the coupler horn to take the force of the blow against the striking plate or dead wood. Now it is found that the force of the blows in switching cars has increased much more than the capacity of the cars or trains, therefore, it is necessary to apply a draft gear which will absorb a great percentage of this blow, and considering this fact a number of manufacturers have made serious mistakes by thinking all that was necessary was to increase the strength of the draft gear to stand these blows. It is considerably less expensive for a car owner to replace the draft gear, or a part of one which may have failed, than to replace center sills in his car.

The testing machine on exhibition at the exhibit of the Cardwell Manufacturing Company is a model of the one on which Robert W. Hunt & Co. made some tests on March 31st. In their report it was stated that a falling weight from a certain distance strikes a blow through a spring of 37½ pounds, when the same weight falling the same distance strikes a blow through the Cardwell friction draft gear model of only 12½ pounds.

The Cardwell Manufacturing Company reports that it has furnished draft gears for a large number of cars, which have practically cost nothing in maintenance during the last three years. The heavy steel tank car presents one of the most trying conditions for draft gear, and in view of these conditions the statement that over 90 per cent of the tank cars built in the United States in the last three years have been equipped with the Cardwell friction draft gear is of especial interest.

The catalogues at the exhibit of the Scullin-Gallagher Iron & Steel Company give a record of the severe M. C. B. tests the Excel couplers withstood without becoming inoperative.

The newly perfected Simplex Coupler exhibited by the American Steel Foundries is attracting a great deal of favorable attention. It has a number of excellent points which are demonstrated by coupling and uncoupling with compressed air.

The Commercial Acetylene Company, New York, is represented by R. J. Ford, O. F. Osby, H. Duran and J. L. Mandeville. The Davis-Bournonville Acetylene Development Company, New York, in the same booth, is represented by W. M. Joyce. Augustine Davis, president, is expected to arrive shortly.

Among the most unique souvenirs being distributed are the \$2,500 accident policies presented to railroad officials by W. S. Bostwick, general manager of the Magnus Metal Company. They are valued by officials of railroads using Magnus metal, but particularly so by those of roads not using this product.

The Watson-Stillman Company is showing in its booth a 60-ton independent pump jack which may be operated at any distance up to 12 feet from the work. This is desirable for use in places of danger to the workmen. This type of jack is made in all capacities up to 1,000 tons, and is similar to the jacks used in driving the shield in the New York tunnels.